



FOURTH SEMIANNUAL REPORT

OF THE

CHIEF OF THE CATTLE BUREAU

TO THE

MASSACHUSETTS:

STATE BOARD OF AGRICULTURE:

JANUARY 9, 1904.

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REPORT.

To the State Board of Agriculture.

I have the honor to submit the fourth semiannual report of the Cattle Bureau of the State Board of Agriculture, as provided for in section 3 of chapter 116 of the Acts of 1902.

This report will be more in detail than the third semiannual report, made to the Board at the meeting at Amherst last June, as the report presented the first of the year is intended to take the place of the annual report formerly made by the Cattle Commission to the Legislature.

The report made in the summer is simply a very brief account of the work done during the first half of the year, while the later one is intended to give a full and detailed statement of the doings of the Cattle Bureau for the entire year. Owing to the necessity of having the report ready by the tenth day of January, it is necessary to close the books of the Bureau the 15th of December. This report therefore includes the period from Dec. 15, 1902, to Dec. 15, 1903.

The report now presented includes the work performed in connection with tuberculosis in cattle and glanders in horses, and also a history of foot and mouth disease, commencing at the point where it was left in the last report, Jan. 1, 1903, to the time of its eradication. Other diseases will be mentioned briefly; but there is not a great deal to say in this connection, as, aside from the outbreak of foot and mouth disease, the year has been more free from other contagious animal diseases than usual, and the principal labor performed aside from that for the suppression of epizoötic aphtha has been chiefly in connection with tuberculosis and glanders.

Owing to the fact that the books are brought up only to the 15th of December each year, the financial statement shows the amount of money on hand at that time, and does not give a clear idea of what the deficiency in the appropria-

tion of the Cattle Bureau may be when all outstanding accounts come in at the end of the year.

For example, the financial statement shows a balance on hand Dec. 15, 1902, of \$16,787.01; but at the end of the year there was a deficiency which required an appropriation of \$4,500. This deficiency was due to the increased expenditures brought about by the outbreak of foot and mouth disease. If it had not been for this, the amount on hand Dec. 15, 1902, would have been ample to meet all outstanding liabilities.

The appended figures show a balance on hand Dec. 15, 1903, of \$2,079.53; but this sum will not be sufficient to meet all the bills which will come in Jan. 1, 1904, and another deficiency appropriation will be required. This deficiency has been kept down to the lowest possible limit by releasing cattle quarantined on suspicion of being tuberculous early in November, when it was apparent that it would not be possible to take any more cattle without causing a large deficiency in the appropriation, which did not seem judicious. Any indebtedness incurred during 1903 in excess of the appropriations is due to increased expenditures incurred on account of foot and mouth disease.

Early in May it was apparent that more money would be needed in order to complete the year's work; and a letter was written to the ways and means committee, calling its attention to this fact, and requesting an additional appropriation of \$25,000, but it was decided by the committee that \$15,000 would be sufficient, and this sum was allowed.

Certain work cannot be relinquished, such as that relating to glanders, and keeping up the rules requiring cattle brought into Massachusetts from without the State to be tested with tuberculin, in order to be sure that they are free from tuberculosis when placed upon our markets.

FINANCIAL STATEMENT.

At the date of the second semianual report of this Bureau,

Dec. 15, 1902, there remained an unexpended balance of	\$16,787 01
Appropriated under chapter 81, Acts of 1903,	58,000 00
Appropriated under chapter 427, Acts of 1903 (additional),	15,000 00
Appropriated under chapter 264, Acts of 1903 (deficit), .	4,500 00
Total appropriations, etc.,	<u>\$94,287 01</u>

During the year ending Dec. 15, 1903, there has been expended in the work of the Bureau as follows:—

For 1,496 head of cattle condemned and killed as tuberculous,	\$33,713 00
For 4 quarantine claims,	9 75
For expenses of killing and burial,	66 78
For expenses of arbitration,	5 75
For 115 quarantine expense claims on account of foot and mouth disease,	9,699 40
For salary of Chief of Bureau,	1,800 00
For expenses of Chief of Bureau,	72 93
For services of agents,	17,971 94
For expenses of agents,	7,998 55
For salaries of clerks and stenographers,	3,736 24
For postage, printing, stationery and other office expenses,	2,538 34
For laboratory and experimental work, exclusive of glanders work,	143 25
For implements, supplies and material for disinfecting,	2,579 73
For expense of quarantine stations at Brighton, Watertown and Somerville,	5,105 05
For expense of glanders work, including killing and burial and laboratory work,	6,766 77
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	\$92,207 48
Unexpended balance,	\$2,079 53

During the year 308 cattle and 5 swine were reported to the Bureau, by butchers, renderers and boards of health, as having been found tuberculous at time of slaughter. These animals were not quarantined, and are not included in the 1,496 head paid for as above. The average price paid for cattle during the year was \$22.59.

Bills of 1902 unsettled at date of last report have been paid during the year as follows:—

347 cattle condemned and killed as tuberculous,	\$8,741 32
Miscellaneous bills,	5,738 77
Quarantine claims on account of foot and mouth disease,	6,967 65
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Total paid on 1902 account,	\$21,447 74

By chapter 427, Acts of 1903, as provided in chapter 83, Resolves of 1903, there was appropriated, to be paid out under the direction of the Chief of the Cattle Bureau of the

State Board of Agriculture, to owners of animals slaughtered previous to April 11 of the current year, for the purpose of exterminating the foot and mouth disease, a sum equal to the difference between the amount paid by the United States and the value of such cattle as appraised by the agents of the United States, \$40,000.

From this appropriation there have been paid 126 claims for animals, as follows:—

2,261 cows,	average, \$52 19,	appraised for	.	.	\$118,006 28
67 bulls,	" 44 77,	"	.	.	3,000 00
9 oxen,	" 90 55,	"	.	.	815 00
4 steers,	" 65 00,	"	.	.	260 00
8 young cattle,	" 21 87,	"	.	.	175 00
167 calves,	" 15 36,	"	.	.	2,617 00
208 swine,	" 4 25,	"	.	.	2,178 00
49 sheep,	" 8 38,	"	.	.	411 00
5 goats,	" 4 20,	"	.	.	21 00
2,778 animals,	Total appraisal,	.	.	.	\$127,483 28
Seventy per cent paid by the United States,	.	.	.	.	89,238 30
Difference, thirty per cent, paid by State,	.	.	.	.	\$38,244 98
Balance of appropriation unexpended,	.	.	.	.	\$1,755 02

Under the provisions of chapter 220, Acts of 1903, 76 stamps have been furnished to 56 towns in the State, for branding the meat of slaughtered animals intended for food.

There has been received during the year, from various sources,—sale of hides and carcasses of condemned animals, sale of ear tags, tuberculin tests for cattle brought to Brighton by non-resident owners, etc.,—the sum of \$1,928.37, which has been paid to the State Treasurer.

The Legislature of 1903 amended section 31 of chapter 90 of the Revised Laws so as to read as follows:—

SECTION 31. Tuberculin as a diagnostic agent for the detection of tuberculosis in domestic animals shall be used only upon cattle brought into the Commonwealth and upon cattle at Brighton, Watertown and Somerville; but it may be used as such diagnostic agent on any animal in any other part of the Commonwealth, with the consent in writing of the owner or person in possession thereof, and upon animals which have been condemned as tuberculous upon physical examination by a competent veterinary surgeon. Such

tests by the use of tuberculin shall be made without charge to citizens of the Commonwealth, and in all other cases the expense of such tests shall be paid by the owners of such animals or by the person in possession thereof. [Approved May 5, 1903.

As all cattle brought to the Brighton market from without the limits of the State are now tested by the agent of the Cattle Bureau in charge of the quarantine stations, and his assistants, and no certificates of test are now received at these stations made by veterinarians residing out of the State, and as many persons bringing cattle into Massachusetts to other points prefer to have the testing done after the arrival of the animals, free of expense, it will be seen that this provision of the law adds materially to the expenses of the Cattle Bureau. Fees from persons not citizens of Massachusetts, received for testing cattle, are turned over to the State Treasurer.

As there are about 20,000 out-of-the-State cattle sold on the Brighton market annually, which it costs about 25 cents per head to test, and 7,000 or 8,000 head brought to other points, 4,000 or 5,000 of which at least have to be tested, and as these tests cost in the neighborhood of \$1 for each animal, it can readily be seen that this legislation will add \$10,000 or \$12,000 per year to the expenses of the Cattle Bureau.

Owing to the difficulty of having all the tests outside of the State made honestly and carefully, it would be more satisfactory to test all animals after arrival; and this plan may be adopted later, if it is found necessary to do so.

The law requires that the results of the inspection of animals and premises, made annually by the inspectors of animals, be incorporated in the annual report of the Cattle Commissioners; and it seems that the intent of the law is that this statement of the condition of the live stock of the State and their surroundings shall be embodied in the report of the Chief of the Cattle Bureau at the close of each year. Owing to the appearance of the foot and mouth disease at the end of 1902, it was found impossible to prepare this report; but a résumé of the work of the local inspectors for 1903 has been compiled, and is given below:—

Work of Local Inspectors for 1903.

CITY OR TOWN.	Number Herds Inspected.	Number Cattle Inspected.	Number Sheep Inspected.	Number Swine Inspected.	Number Hedges and in Good Condition.	Number Hedges Kept in Good Condition.	Number Sheep Inspected.	Number Swine Inspected.	Number Stables Well Located.	Number Stables Kept Clean.	Number Stables Kept.	Number Water Supply.	Number Paved Roads.	Number Roads since Last Report.	Number Goats.	
Abington,	119	308	238	108	2	132	121	112	81	55	98	118	-	-	-	-
Action,	122	1,240	790	118	13	117	147	144	131	144	144	145	16	16	-	-
Acushnet,	133	597	336	127	1	284	134	94	126	126	128	132	2	1	-	-
Adams,	82	933	541	81	23	257	83	75	65	71	83	83	-	-	-	-
Agawam,	144	1,500	798	137	-	441	152	137	131	145	146	147	5	-	-	-
Alford,	52	448	319	46	197	161	58	35	48	56	53	55	3	-	-	-
Amesbury,	129	568	369	87	10	275	137	126	94	65	89	128	-	-	-	-
Anherst,	70	994	664	65	-	149	78	71	41	45	71	68	-	-	-	-
Andover,	144	1,215	798	129	-	927	149	146	144	145	147	145	-	-	-	-
Arlington,	82	203	173	82	-	47	83	74	72	74	83	83	-	-	-	-
Ashburnham,	119	664	373	103	34	179	120	113	86	109	111	111	6	-	-	-
Ashby,	95	508	337	89	14	104	97	94	76	89	91	97	1	-	-	-
Ashfield,	166	1,706	725	153	1,226	337	181	157	149	161	173	178	1	-	-	-
Ashland,	79	449	231	74	-	211	79	*-	*-	*-	*-	*-	*-	-	-	-
Athol,	112	668	343	96	26	496	116	98	76	86	110	104	2	-	-	-
Attleborough,	170	1,062	720	116	-	642	174	165	167	172	172	172	2	-	-	-

Auburn,	• • •	57	755	390	53	339	4	57	54	42	50	53	41	45	42	43	45	—
Avon,	• • •	45	144	121	42	3	94	45	42	33	41	33	41	33	42	43	45	—
Ayer,	• • •	28	127	87	28	—	77	30	29	29	29	29	29	29	28	29	29	—
Barnstable,	• • •	243	742	438	172	17	605	244	194	233	232	232	232	232	232	232	232	—
Barre,	• • •	74	2,063	719	69	57	200	84	80	71	82	82	82	82	84	84	84	13
Becket,	• • •	85	780	345	85	176	147	89	68	87	89	88	88	89	89	89	89	1
Bedford,	• • •	70	754	460	70	12	484	73	70	72	73	73	72	73	73	73	73	—
Belchertown,	• • •	286	2,346	1,346	277	32	465	310	270	275	306	306	306	306	304	310	310	4
Bellingham,	• • •	107	613	430	103	3	273	121	108	42	99	99	107	113	113	113	113	5
Belmont,	• • •	33	176	104	33	—	245	33	32	30	32	32	32	33	33	33	33	—
Berkley,	• • •	80	388	247	73	6	268	80	—	—	—	—	—	—	—	—	—	2
Berlin,	• • •	87	671	396	87	3	102	91	87	90	89	89	91	91	91	91	91	—
Bernardston,	• • •	87	878	424	42	400	254	98	75	55	1	48	48	48	48	48	48	—
Beverly,	• • •	66	652	419	59	1	79	68	63	54	66	66	64	68	68	68	68	2
Billerica,	• • •	109	865	631	100	—	218	109	107	106	104	104	98	97	97	97	97	—
Blackstone,	• • •	104	511	230	86	2	174	105	85	78	74	74	74	74	74	74	74	—
Blandford,	• • •	120	1,281	613	113	268	170	151	120	110	141	141	146	137	137	137	137	2
Bolton,	• • •	100	860	*—	72	1	206	100	—	—	—	—	—	—	—	—	—	*—
Boston,	• • •	161	1,005	902	155	—	1,234	166	166	165	165	165	165	165	165	165	165	6
Bourne,	• • •	66	143	65	55	—	27	56	55	56	56	56	56	56	56	56	56	—
Boxborough,	• • •	50	628	315	47	21	135	57	56	55	55	55	55	55	55	55	55	—

* No report.

Work of Local Inspectors for 1903—Continued.

CITY OR TOWN.	Number Hrds Cattle Neat. Cow's Spec'd.	Number Hrds Miche Spec'd.	Number Cattle Kept in Good Condit'.	Number Sheep Spec'd.	Number Sheep Swine Spec'd.	Number Stables Well Located.	Number Stables Lat'd.	Number Stables Kept Centr.	Number Stables With Good Water Sup.	Number Stables Impr'ved Last	Number Stables Since Imp'rev'd Report.	Number Goats. Last
Poxford,	• • •	60	623	342	56	19	217	69	66	59	65	2
Boylston,	• • •	69	734	487	66	4	616	71	66	68	69	—
Braintree,	• • •	66	463	375	63	—	212	71	62	67	66	—
Brewster,	• • •	92	219	45	87	26	115	92	74	42	89	6
Bridgewater,	• • •	165	847	583	162	41	807	166	154	130	134	2
Brinfield,	• • •	112	1,284	572	112	123	228	123	117	105	117	4
Brockton,	• • •	133	1,022	774	117	—	1,028	139	132	129	124	—
Brookfield,	• • •	135	945	545	105	37	240	134	117	103	108	—
Brookline,	• • •	25	205	50	21	—	4	27	19	21	18	—
Buckland,	• • •	94	949	469	62	74	224	123	104	48	52	—
Burlington,	• • •	46	437	337	44	—	3,328	46	46	44	46	1
Cambridge,	• • •	15	83	80	15	—	—	16	15	16	16	—
Canton,	• • •	126	623	418	125	41	860	128	112	87	116	128
Carlisle,	• • •	68	638	410	43	2	85	68	57	53	42	67
Carver,	• • •	89	188	113	88	19	85	89	84	83	87	3
Charlemont,	• • •	77	701	475	75	89	121	80	74	49	80	1

Work of Local Inspectors for 1903—Continued.

City or Town.	Number Herds inspected.	Number Neat cattle specified.	Number Milk cows specified.	Number Horses inspected.	Number Sheep inspected.	Number Swine inspected.	Number Stables inspected.	Number Well located.	Number Stables well situated.	Number Stables kept Clean.	Number Stables kept Stable.	Number Stables with good supply.	Number Stables since last report.	Number Stables.	Number Goats.	
Deerfield,*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dennis,	89	212	108	65	-	79	88	73	64	77	74	-	66	-	-	-
Dighton,	99	450	336	98	2	175	110	104	104	107	110	110	-	-	-	-
Douglas,	-	-	360	207	89	-	153	108	86	61	89	90	97	4	-	-
Dover,	-	-	56	589	424	48	2	201	57	54	36	36	49	57	2	-
Dracut,	-	-	79	1,202	894	80	12	912	80	78	78	79	80	80	-	-
Dudley,	-	-	95	1,156	695	92	-	65	96	89	64	95	90	96	2	-
Dunstable,	-	46	466	292	41	9	137	47	46	41	47	46	45	6	-	-
Duxbury,	-	126	410	252	27	35	259	128	124	107	128	116	128	1	-	-
East Bridgewater,	-	164	706	466	160	9	334	167	79	164	166	166	164	17	-	-
East Longmeadow,	91	583	407	91	-	131	91	72	79	88	91	91	-	-	-	-
Eastham,	61	140	94	68	2	57	61	49	37	40	53	53	53	2	-	-
Easthampton,	121	1,047	583	121	2	311	137	123	136	137	135	137	-	-	-	-
Easton,	187	896	639	185	-	83	197	149	158	195	187	197	197	2	-	-
Edgartown,	61	295	184	61	736	186	64	64	64	64	64	64	64	-	104.	13
Egremont,	96	906	704	96	221	192	104	104	104	100	100	100	100	104.	-	30

* No report.

Work of Local Inspectors for 1903—Continued.

CITY OR TOWN.	Number Herds Inspected.	Number cattle expected.	Number Milked Cows.	Number Sheep Inspected.	Number Swine Inspected.	Number Horses kept in Good Condition.	Number Cattle Specified.	Number Milked Cows Specified.	Number Sheep Inspected.	Number Swine Inspected.	Number Stables well located.	Number Stables well lighted.	Number Stables kept Clean.	Number Stables with Supply.	Number Stables since Report.	Number Livestock.	Number Goats.
Granby,	.	.	.	1,275	1,042	95	19	266	131	122	71	124	106	120	1	-	-
Granville,	.	.	.	142	1,048	578	142	105	419	176	173	171	175	175	8	-	-
Great Barrington,	.	.	.	140	1,649	928	136	70	537	155	97	145	152	154	2	-	-
Greenfield,	.	.	.	147	1,248	544	145	420	443	147	135	144	145	145	-	-	-
Greenwich,	.	.	.	75	488	293	74	-	122	75	73	73	74	75	53	4	-
Groton,	.	.	.	144	1,061	591	74	101	152	151	141	104	139	88	128	2	-
Groveland,	.	.	.	67	338	183	63	46	140	69	61	60	66	61	68	-	-
Iadley,†	.	.	.	201	1,642	890	153	37	771	254	229	167	228	223	239	2	-
Halifax,	.	.	.	73	189	109	71	7	92	73	61	30	62	40	68	2	-
Hamilton,	.	.	.	64	366	227	59	-	195	64	*-	*-	*-	*-	*	-	-
Hampden,	.	.	.	80	763	304	62	-	128	86	78	72	80	82	82	-	-
Hancock,	.	.	.	66	875	431	59	782	202	100	60	47	97	77	99	-	-
Hanover,	.	.	.	114	329	243	111	9	182	114	104	110	111	109	112	2	1
Hanson,	.	.	.	116	193	155	114	-	411	116	91	91	91	90	94	4	-
Hardwick,	.	.	.	129	2,324	1,219	111	22	276	140	124	94	123	128	134	-	-
Harvard,	.	.	.	165	1,639	769	125	80	204	170	165	157	133	146	122	146	6

Harwich,	.	.	134	233	164	130	78	128	129	129	125	125	125	125
Hatfield,	*	*	125	374	309	125	-	268	125	124	125	125	125	-
Haverhill,	*	*	180	1,395	812	154	-	465	184	178	131	157	144	2
Hawley,	*	*	81	852	382	76	217	163	81	71	81	81	81	-
Heath,	*	*	83	1,045	427	78	233	250	104	70	98	103	104	2
Hingham,	*	*	165	667	463	164	18	366	164	131	162	164	163	-
Hinsdale,	*	*	96	909	480	94	80	155	109	65	54	54	33	1
Holbrook,	*	*	70	198	134	65	1	408	70	69	66	66	64	70
Holden,	*	*	127	1,039	50	110	77	174	131	123	119	122	108	125
Holland,	*	*	34	235	93	32	11	84	34	31	19	32	31	-
Holliston,	*	*	120	804	568	108	4	155	124	107	115	117	108	121
Holyoke,	*	*	75	717	430	67	2	145	83	54	51	70	66	53
Hopedale,	*	*	30	112	84	28	-	45	32	31	31	32	31	1
Hopkinton,	*	*	129	769	343	90	2	186	129	123	85	82	93	122
Hubbardston,	*	*	110	1,030	562	104	78	172	122	112	109	119	108	122
Hudson,	*	*	48	373	227	38	1	138	48	44	38	35	40	48
Hull,	*	*	18	54	48	14	-	19	18	11	6	8	13	-
Huntington,	*	*	102	740	328	102	208	179	111	67	106	106	110	91
Hyde Park,	*	*	18	64	54	16	-	6	10	13	11	12	14	18
Ipswich,	*	*	140	939	615	138	-	306	147	142	144	147	147	1
Kingston,	*	*	96	325	183	94	1	252	104	79	79	91	104	2

* No report.

† Incomplete report.

Work of Local Inspectors for 1903—Continued.

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Lunenburg,	.	.	123	1,200	707	121	83	252	123	118	120	123	123	123	123
Lynn,	.	.	85	273	195	54	2	74	85	81	54	81	52	85	1
Lynnsfield,	.	.	43	428	322	42	-	97	46	39	45	46	45	46	-
Maiden,	.	.	10	85	77	8	-	-	12	11	10	8	11	11	-
Manchester,	.	.	34	110	86	32	8	94	36	32	21	21	26	34	-
Mansfield,	.	.	101	295	205	91	-	58	100	94	73	82	68	87	5
Marblehead,	.	.	48	392	286	25	5	151	47	41	20	17	37	10	14
Marion,	.	.	56	164	123	52	8	166	56	54	50	53	49	54	2
Marlborough,	.	.	146	1,100	744	141	4	649	152	147	142	141	148	149	13
Marlfield,	.	.	148	558	336	132	266	203	148	134	67	88	126	144	2
Mashpee,	.	.	25	34	17	25	-	64	25	24	25	25	25	25	-
Mattapoisett,	.	.	89	318	196	86	2	276	90	86	66	79	87	89	-
Maynard,*	.	.	-	-	-	-	-	-	-	-	-	-	-	-	-
Medfield,	.	.	70	587	381	64	-	523	72	69	54	56	69	64	-
Medford,	.	.	94	430	357	84	-	26	94	85	90	90	89	94	6
Medway,	.	.	76	489	295	45	-	82	76	71	66	70	60	66	1
Melrose,*	.	.	-	-	-	-	-	-	-	-	-	-	-	-	-
Mendon,	.	.	97	647	412	93	-	132	110	108	69	93	93	110	3
Merrimac,	.	.	58	361	230	24	2	117	56	39	29	*-	32	29	-
Methuen,	.	.	169	1,459	1,042	100	160	490	171	161	108	102	79	171	2
Middleborough,	.	.	201	788	482	175	27	323	221	191	174	189	194	215	2

* No report.

Work of Local Inspectors for 1903—Continued.

CITY OR TOWN.	Number Herds Inspected.	Number cattle in inspected.	Cows in milked.	Number Horses in good condition.	Number Sheep inspected.	Number Swine inspected.	Number Tables well located.	Number Tables well lighted.	Number Tables late.	Number Stables kept clean.	Number Stables with water supply.	Number Stables since report issued.	Number Goats.	
Middlefield,	46	578	242	47	331	124	51	48	45	50	50	47	1	-
Middleton,	58	320	201	39	4	106	65	60	48	47	50	63	-	-
Millford,	142	483	357	134	-	279	142	135	129	125	127	142	6	-
Millbury,	137	923	603	123	-	388	154	130	139	145	150	152	4	58
Mills,	61	636	294	58	12	18	64	55	49	59	60	61	1	-
Milton,	110	848	697	110	-	170	113	112	112	112	112	113	3	-
Monroe,	35	187	107	26	41	91	28	28	27	27	27	28	-	-
Monson, ^f	133	1,345	660	119	66	386	150	135	130	132	132	140	-	11
Montague,	148	1,083	516	116	34	496	157	133	88	127	131	139	6	-
Montgomery,	70	637	386	63	75	308	74	48	37	72	72	74	-	-
Mount Washington,	16	103	33	13	-	30	16	13	8	10	16	16	-	-
Nahant,	4	15	14	4	-	-	4	3	3	3	3	3	-	-
Nantucket,	77	615	365	75	253	287	78	66	72	72	76	23	-	-
Natick,	77	539	393	68	-	472	77	69	62	41	67	71	3	-
Needham, ^f	94	763	574	75	10	17	99	32	36	55	67	100	-	-

* No report.

† Incomplete report.

Work of Local Inspectors for 1903—Continued.

Plymouth, [†]	•	•	120	349	249	111	-	324	120	98	106	113	2	
Plympton,	•	•	66	257	120	62	-	83	66	62	58	51	44	2
Prescott, [*]	•	•	67	483	243	61	30	149	70	58	57	58	45	2
Princeton, [†]	•	•	42	901	488	32	64	60	42	9	30	40	39	2
Provincetown,	•	•	13	94	63	13	-	13	13	12	11	6	12	-
Quincy, [*]	•	•	206	809	660	186	-	256	219	177	177	179	200	210
Randolph,	•	•	87	406	239	81	-	706	92	85	69	83	91	91
Raynham,	•	•	48	392	268	43	-	143	49	47	39	40	45	34
Reading, [*]	•	•	97	382	326	96	6	89	97	93	95	96	97	4
Rehoboth,	•	•	260	1,787	1,138	256	25	892	347	345	347	347	342	-
Revere, [*]	•	•	37	138	127	37	1	750	38	26	38	37	37	38
Richmond,	•	•	95	575	333	95	650	275	95	74	79	92	89	95
Rochester,	•	•	51	250	158	41	-	127	51	49	22	50	49	46
Rockland,	•	•	112	293	182	86	-	48	113	107	76	64	64	110
Rockport,	•	•	53	217	190	48	-	24	54	53	51	49	48	-
Rowe, [*]	•	•	77	724	291	74	208	212	78	*-	*-	*-	*-	-
Rowley, [*]	•	•	66	643	276	49	22	89	69	54	50	51	50	66
Royalston, [†]	•	•	111	869	411	78	56	336	118	90	79	81	81	80
Russell, [*]	•	•	45	197	96	43	105	89	49	34	32	42	44	45
Rutland, [*]	•	•	112	1,113	619	109	-	236	133	129	116	132	122	133
Salem, [*]	•	•	12	286	235	12	8	108	14	7	6	6	11	14

[†] Incomplete report.^{*} No report.

Work of Local Inspectors for 1903—Continued.

CITY OR TOWN.	Number Herds inspected.	Number cattle inspected.	Number sheep inspected.	Number cattle specie ^d .	Number herds kept in Good condition.	Number herds kept in Good and Bad condition.	Number swine inspected.	Number tables inspected.	Number tables inspected.	Number tables inspected.	Number tables inspected.	Number tables inspected.	Number tables inspected.	Number goats since last report.	Number goats since last report.	Number goats since last report.	Number goats since last report.	Number goats since last report.
Salisbury,	•	•	116	532	274	105	23	273	116	101	102	101	101	96	9	-	-	-
Sandisfield,	•	•	113	1,071	465	110	111	155	121	113	115	111	111	120	6	-	-	-
Sandwich,	•	•	89	270	109	62	-	82	89	57	79	86	86	68	-	-	-	-
Saugus,	•	•	45	867	736	40	-	348	57	50	49	50	56	56	3	-	-	-
Savoy,	•	•	86	726	384	73	80	152	104	38	39	45	85	88	1	-	-	-
Scituate,	•	•	124	370	242	123	12	98	123	89	82	101	117	120	-	-	-	-
Seekonk,	•	•	139	1,350	911	122	22	1,754	148	97	99	103	125	121	4	-	-	-
Sharon,	•	•	73	333	220	71	-	34	75	63	62	73	71	51	6	-	-	-
Sheffield,	•	•	188	2,316	1,142	141	85	524	226	162	130	218	213	187	7	-	-	-
Shelburne,	•	•	105	1,714	68	88	729	344	105	*-	*-	*-	*-	*-	-	-	-	-
Sherborn,	•	•	113	1,108	615	111	-	608	128	114	112	115	115	117	4	-	-	-
Shirley,	•	•	61	368	236	55	7	116	65	18	57	58	57	64	-	-	-	-
Shrewsbury,	•	•	146	1,451	1,061	139	30	479	149	121	142	142	139	147	6	-	-	-
Shutesbury,	•	•	43	170	54	41	26	79	43	42	42	42	43	43	-	-	-	-
Somerset,	•	•	69	520	409	67	-	373	69	66	58	68	68	56	1	-	-	-
Somerville,	•	•	55	147	138	43	-	90	54	29	35	47	47	40	54	-	-	-

South Hadley,	•	123	1,344	956	97	5	305	148	121	119	138	117	146	1
Southampton,	•	142	1,135	733	133	65	279	143	111	133	142	139	140	1
Southborough,	•	53	1,087	762	32	110	101	59	54	47	45	35	47	-
Southbridge,	•	73	789	468	65	62	193	78	73	70	71	66	77	2
Southwick,	•	132	1,024	606	128	78	270	149	124	139	148	144	143	2
Spencer,	•	115	1,545	842	113	29	257	120	114	114	117	114	117	1
Springfield,	•	162	489	305	134	13	1,674	162	64	63	62	103	84	2
Sterling,	•	132	1,651	1,227	28	66	153	134	78	72	92	2	104	-
Stockbridge,*	•	106	940	549	99	161	409	112	76	77	91	92	107	-
Stoneham,	•	66	315	266	50	-	142	89	32	33	31	51	50	2
Stoughton,	•	132	533	303	100	-	156	136	90	82	101	90	132	2
Stow,	•	63	828	491	56	-	47	73	69	69	71	72	72	1
Sturbridge,	•	52	474	243	47	45	154	52	49	50	52	52	52	1
Sudbury,*	•	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunderland,	•	52	563	390	35	10	344	53	33	21	40	17	44	-
Sutton,	•	174	1,263	767	152	54	365	186	164	141	176	169	172	6
Swampscott,*	•	-	-	-	-	-	-	-	-	-	-	-	-	-
Swansea,	•	115	1,048	762	114	4	477	135	99	86	125	131	131	-
Taunton,*	•	238	1,293	1,031	235	12	803	238	* _—	-				
Templeton,	•	95	584	364	94	4	209	102	96	83	96	91	100	-

* No report.

CITY OR TOWN.	Number Herds inspected.	Number Cattle inspected.	Number Milk specimens.	Number Cows inspected.	Number Sheep inspected.	Number Swine inspected.	Number Stables well located.	Number Stables late'd.	Number Stables well located.	Number Stables kept Clean.	Number Stables With Good Sup. Wt'd.	Number Stables since Imp'ved.	Number Stables in Prov'd. Report.	Number Goats.	
Gewksbury,	143	549	490	1	533	146	131	121	118	116	82	-	-	-	-
Risbury,	22	75	56	21	54	23	17	14	17	20	19	-	-	-	-
Tolland,	46	518	257	36	32	146	67	49	50	58	66	1	-	*-	-
Donsfield,	68	650	477	63	-	60	68	*-	*-	*-	*-	-	-	-	-
Townsend,	139	555	320	114	4	243	142	138	131	135	118	4	4	-	-
Truro,	63	240	157	63	-	57	63	62	63	63	63	1	-	-	-
Lynghborough,*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tyningham,	60	630	301	53	143	131	85	80	77	85	84	4	-	-	-
Upton,	107	601	308	33	1	192	116	66	80	64	93	7	-	-	-
Juxbridge,	150	889	511	145	37	283	154	142	136	141	147	2	-	-	-
Wakefield,	82	371	205	80	-	264	89	56	79	80	80	7	-	-	-
Wales,	56	297	155	25	28	72	61	52	42	50	61	2	-	-	-
Walpole,*	98	513	*-	94	19	272	98	*-	*-	*-	*-	-	-	-	-
Waltham,*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ware,	133	966	646	31	8	337	66	12	135	59	66	8	-	-	-

Wareham,	89	263	194	89	19	109	89	89	89	89	89	89	89	1
Warren,	134	1,987	998	112	18	269	160	149	97	22	114	121	3	-
Warwick,	83	436	208	78	21	158	87	85	76	86	82	87	-	-
Washington, ^t	61	686	304	45	485	191	68	28	27	15	47	40	-	27
Watertown, [*]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wayland,	83	845	648	88	-	956	83	64	82	82	83	78	-	-
Webster,	35	254	178	33	2	4	37	26	22	27	34	37	-	-
Wellesley,	69	339	262	55	-	1	72	38	39	43	56	72	-	-
Wellfleet,	42	109	62	37	-	36	42	37	37	37	39	42	-	-
Wendell,	55	216	107	55	19	212	56	44	43	41	52	56	-	-
Wenham,	45	246	180	63	-	107	45	40	39	39	43	45	-	-
West Boylston,	80	718	456	76	28	418	83	78	76	78	71	79	-	-
West Bridgewater,	53	818	583	51	16	241	55	41	41	39	62	55	-	-
West Brookfield,	92	1,479	760	79	40	200	107	104	102	103	102	106	-	30
West Newbury,	97	956	585	98	90	325	100	99	99	99	100	100	-	-
West Springfield,	122	932	663	120	14	423	122	111	111	113	115	118	-	-
West Stockbridge,	110	451	319	110	409	355	111	69	69	69	111	111	2	-
West Tisbury,	66	263	146	66	862	92	66	66	66	66	66	66	-	-
Westborough,	109	1,096	1,08	11	691	149	142	132	147	131	146	146	18	-
WestHeld,	213	1,387	887	192	20	664	215	198	176	170	188	210	-	-

* No report.

[†] Incomplete report.

† 22 deer, 5 moose and 2 elk.

Work of Local Inspectors for 1903—Concluded.

CITY OR TOWN.	Number Herds inspected.	Number Cattle in cows specified.	Number Milk cows specified.	Number Cows in good condition.	Number Herds kept clean and in good condition.	Number Sheep inspected.	Number Swine inspected.	Number Stables inspected.	Number Stables well located.	Number Stables well located.	Number Stables kept clean.	Number Stables with gates.	Number Stables in impeded L. & S. report.	Number Gates.	
Westford, . . .	99	977	595	92	-	89	103	101	87	95	82	102	-	-	-
Westhampton, . . .	64	659	290	58	10	104	64	*-	*-	*-	*-	*-	-	-	-
Westminster, . . .	68	512	344	65	4	2	69	62	46	2	66	-	-	5	-
Weston, . . .	131	1,146	815	124	18	544	143	129	134	135	135	140	7	-	-
Westport, . . .	302	1,462	964	294	23	484	317	209	193	236	287	301	4	-	-
Westwood, . . .	73	565	426	70	-	387	77	72	72	72	71	72	-	-	-
Weymouth, . . .	189	658	533	144	2	229	190	166	152	115	114	180	-	-	-
Whately, . . .	108	846	446	108	19	416	119	119	113	113	118	119	1	-	-
Whitman, . . .	88	342	289	87	2	212	88	71	73	71	74	88	-	-	-
Wilbraham, . . .	107	1,021	578	92	-	308	150	89	95	134	106	139	-	-	-
Williamsburg, . . .	90	777	356	55	30	162	93	79	44	64	58	69	-	-	-
Williamstown, . . .	199	1,737	1,091	163	99	685	202	182	126	108	184	202	6	-	-
Wilmington, . . .	89	264	168	86	-	222	89	82	67	84	80	88	-	-	-
Winchendon, . . .	135	502	331	6	55	307	140	135	130	137	133	140	-	-	-
Winchester, . . .	21	199	172	17	-	87	21	16	18	20	19	21	-	-	-

Windsor,	-	-	90	1,014	497	88	66	223	109	72	87	101	106	109	-	-
Winthrop,	-	-	16	35	34	7	-	-	16	16	16	16	16	16	-	-
Woburn,*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester,	-	-	285	2,182	1,712	277	83	1,943	285	272	274	272	280	280	4	-
Worthington,	-	-	104	1,065	505	85	181	242	121	100	102	113	112	114	1	-
Wrentham,	-	-	171	737	440	94	-	378	171	*-	*-	*-	*-	*-	*-	-
Yarmouth,	-	-	46	135	91	43	-	100	46	44	44	42	46	46	1	-
			32,913	243,291	155,626	29,352	26,377	30,058	34,741	28,066	25,703	27,882	28,898	30,777	575	173

* No report.

The above table shows the work accomplished by the inspectors of animals in various cities and towns.

No reports have been received from the following towns :—

Deerfield,	Sudbury,	Waltham,
Maynard,	Swampscott,	Watertown,
Melrose,	Tyngsborough,	Woburn.

Reports from the following towns are incomplete :—

Ashland,	Newton,	Royalston,
Berkley,	North Adams,	Shelburne,
Bolton,	Northampton,	Taunton,
Hadley,	Northfield,	Topsfield,
Hamilton,	Peabody,	Walpole,
Monson,	Pembroke,	Washington,
Needham,	Plymouth,	Westhampton,
Newburyport,	Princeton,	Wrentham.
New Marlborough,	Rowe,	

In Melrose the inspector died, and a new one was appointed about the middle of November, when the inspection should have been brought to a close ; and in Waltham the inspector left town, and another was appointed at about the same time. This accounts for no reports being received from these two cities.

The report of the inspectors of animals is in the main not as full as in many of the preceding years.

Many of the inspectors of animals are painstaking, conscientious men ; while others are careless, and do not take the pains in the performance of their duties that they should. The trouble in the latter cases is perhaps not altogether the fault of the inspectors, as in some towns the position is not considered of the importance that it really is, and the selectmen appoint the man who will do the work the cheapest ; consequently the duties in such towns are not well performed, because no one can afford to do them properly for the price paid. In a few cases there has been a tendency to make the position a reward for political services ; but this has been checked, as the appointments are made subject to the approval of the Chief of the Cattle Bureau, and in two or three instances confirmation of appointees has been withheld until a suitable person was named for the position.

At the close of the outbreak of foot and mouth disease a house-to-house inspection was made by agents of the United States Bureau of Animal Industry in towns where the outbreak occurred and in some of the adjoining towns. To assist them in this work the reports of the inspectors of animals for 1902 were lent to the Bureau of Animal Industry, from which to obtain a list of cattle owners in different places. The list of names taken from the book of Dr. E. M. Brastow of Wrentham was found to contain the name of every cattle owner in that town; and that of Dr. N. C. Bullard of North Attleborough contained every cattle owner but two. The names of such inspectors deserve to be placed upon a roll of honor. Unfortunately, this is not the case in every city and town; in many places the lists contained the names of all the large owners, but not the persons who owned only one or two cows. In one town, not far from Boston, and a well-to-do town at that, the list was found to be very meagre; the explanation of the inspector of animals here was that the "selectmen only allowed him \$50 per year, and he worked until he thought he had earned that amount, and then stopped."

The law requires inspectors of animals to be sworn to perform the duties of the office faithfully; and, if the town will not allow enough to pay for the performance of the duties properly, then the appointee ought to refuse to accept the position.

Another reason for the inspectors' reports not being better may be due to the fact that the express company to whom the books were given for delivery early in October was very dilatory, and the inspectors did not receive them in some instances for ten days or two weeks after they were taken from the Cattle Bureau office.

TUBERCULOSIS.

As the principal item of expense in the duties of the Cattle Bureau is tuberculosis, it will be mentioned first. As usual, it may be divided under three heads:—

First.—That portion of the work comprised under the quarantining of animals by the local inspectors, on suspicion

of being tuberculous, which have to be examined by agents of the Cattle Bureau, and, if found to be diseased, are appraised and killed.

Second.—Testing cattle received at the quarantine stations for sale into the herds of the State, exclusive of beeves for immediate slaughter, and calves under six months old; also testing cattle brought to other points upon which satisfactory certificates of test are not received, and the release of cattle which have been already satisfactorily tested.

Third.—What is known as “voluntary request work,” where entire herds are tested at the request of owners, with a view to eradicating tuberculosis from them.

During the year animals have been quarantined in 276 different cities and towns of the State, by local inspectors, as tuberculous or as having been brought into Massachusetts and held in quarantine until satisfactory evidence of tuberculin test was presented to the Chief of the Cattle Bureau, as follows:—

<i>Massachusetts Cattle.</i>		
Number released,		466
Number condemned, killed and paid for,		1,144
Number permit to kill, and paid for,		28
Number permit to kill, no award,		121
Number died in quarantine, no award,		54
Number condemned and killed, in process of settlement,		297
Number released for lack of funds,		326
Total Massachusetts cattle quarantined,	—	2,436

<i>Cattle from without the State.</i>		
Number released,		561
Number condemned, killed and paid for,		8
Number condemned and killed, no award,		110
Number died in quarantine,		1
Number in quarantine, unsettled,		7
Total out-of-State cattle quarantined,	—	687
Whole number cattle quarantined,	—	3,123

Of the cattle quarantined, two were found affected with actinomycosis, one of which was released and the other condemned and killed.

Of the 118 condemned and killed, on suspicion of being

tuberculous, brought into Massachusetts from without the State, 79 were tested and retested at Brighton, and the other 39 were tested at other places. Eight in all were found to show no lesions of tuberculosis, and the State had to reimburse the owners for the value of these animals. These errors were about evenly divided between Brighton and other points. The 561 animals quarantined by the local inspectors because they were brought in from without the State are included among the 8,442 animals brought to points outside of Brighton market, upon which tests were required.

It will be seen that since early in November it has been necessary to release 326 animals for lack of funds. Many of these undoubtedly showed marked physical evidence of disease, and some will doubtless have to be taken care of early in 1904; others have probably been disposed of by their owners as cheap beef, judging from reports received of animals condemned in slaughter houses recently as too badly infected with tuberculosis to be passed as fit for food by agents of boards of health.

The *second section* of the work in connection with tuberculosis includes *testing and releasing* the cattle at Brighton market every week, outside of animals intended for immediate slaughter and calves under six months old; and also the *granting of permits* for cattle brought to other points, and testing those upon which satisfactory certificates of test are not received.

It has been found that the first test on cattle at Brighton does not always prove reliable, and any cattle that give an apparent reaction are held over a week and retested with a double dose of tuberculin. Those reacting a second time are killed, and any that do not react on a retest are released. One hundred and twenty-six reacted the first time; of these, 79 reacted on the second test, and the remaining 47 were released. As the Brighton market was closed for the sale of milch cows and store cattle from Nov. 26, 1902, to July 22, 1903, the figures for cattle tested and released or condemned at Brighton are for animals received there during the last half of the year. Milch cows and store cattle arriving at the yards at Watertown and Somerville each week are

taken to the large stock barn at Brighton to be tested, and are sold there.

Receipts of Stock at the New England Dressed Meat and Wool Company's Yards at Somerville, Dec. 15, 1902, to Dec. 15, 1903.

Maine cattle,	.	.	.	.	.	.	463
New Hampshire cattle,	.	.	.	.	.	.	2,867
Vermont cattle,	.	.	.	.	.	.	5,952
Western cattle,	.	.	.	.	.	.	26,634
Sheep,	.	.	.	.	.	.	386,925
Swine,	.	.	.	.	.	.	1,043,093

Cattle not for immediate slaughter have been tested by the Cattle Bureau at Brighton, and are included in the Brighton report.

Receipts of Stock at the Watertown Stock Yards, from Dec. 15, 1902, to Dec. 15, 1903.

Vermont cattle,	.	.	.	.	.	.	3,950
New Hampshire cattle,	.	.	.	.	.	.	1,997
Massachusetts cattle,	.	.	.	.	.	.	1,260
Western cattle,	.	.	.	.	.	.	20,528
Sheep,	.	.	.	.	.	.	10,138
Swine,	.	.	.	.	.	.	1,619
Calves,	.	.	.	.	.	.	7,511

Milch cows and store cattle are driven to the stock barn at Brighton yards, and there tested.

Receipts of Stock at Brighton, from Dec. 15, 1902, to Dec. 15, 1903.

Maine cattle,	.	.	.	.	.	.	5,032
New Hampshire cattle,	.	.	.	.	.	.	300
Vermont cattle,	.	.	.	.	.	.	531
Massachusetts cattle,	.	.	.	.	.	.	9,948
New York cattle,	.	.	.	.	.	.	397
Western cattle,	.	.	.	.	.	.	17,721
Sheep,	.	.	.	.	.	.	25,983
Swine,	.	.	.	.	.	.	10,500
Calves,	.	.	.	.	.	.	20,039
Cattle tested,	.	.	.	.	.	.	6,707
Cattle released after test,	.	.	.	.	.	.	6,628
Cattle condemned after test,	.	.	.	.	.	.	79
Total milch cows and store cattle on the market,	.	.	.	.	.	.	13,149

Total Receipts of Live Stock at the Three Stations, from Dec. 15, 1902, to Dec. 15, 1903.

Cattle,	.	.	.	.	.	.	97,570
Sheep,	.	.	.	.	.	.	423,046
Swine,	.	.	.	.	.	.	1,055,212
Calves,	.	.	.	.	.	.	107,987
Cattle tested at stations (of which 126 are re-tests),	.	.	.	.	.	.	6,707
Cattle released after test,	.	.	.	.	.	.	6,628
Cattle condemned after retest,	.	.	.	.	.	.	79

Of the 79 condemned, 28 were so badly diseased as to have to be rendered; the owners received the returns for beef on all but 5, which were found free from disease, and for which the State had to pay.

The receipts of cattle, sheep, swine and calves from New England were very small during the first half of the year, because of foot and mouth disease, most of the animals having been received since June 15.

Report of Cattle brought into the State during the Year, to Points outside the Quarantine Stations.

During the year 1903, 995 permits were issued to bring cattle into Massachusetts, 164 of which were not used; 12 were cancelled on account of the discovery of foot and mouth disease in New Hampshire and Vermont. On the balance, the following cattle were brought in:—

For dairy and breeding purposes, tested before shipment,	.	4,717
For dairy and breeding purposes, tested after arrival,	.	3,725
Calves under six months old, requiring no test,	.	180
Cattle returned from out-of-State pastures,	.	230
Cattle to be pastured and returned to Rhode Island,	.	13
Cattle that died before they could be tested,	.	3
Cattle that had previously been inspected by the United States authorities, on which no State test was required,	.	50
 Total,	.	8,918

Ninety-four permits were for cattle for immediate slaughter, 20 being for a carload weekly, and 1 for five or six car-loads weekly. On these permits a great many cattle were brought in for beef, the exact number not being recorded.

Two permits gave the privilege of bringing cattle in to be fattened and sold for beef later. Seven permits were given for cattle that were to be unloaded *en route* through the State. Nineteen permits were given allowing cattle to be brought into Massachusetts for exhibition purposes, and 4 for cattle to be returned from exhibition in other States. One permit was given allowing cattle to be brought weekly from Rhode Island into this State, after having been previously tested at Brighton and shipped thence to Providence, R. I. One permit was given allowing 20 head of cattle to be brought from Vermont to Haverhill, the cattle being immediately thereafter taken into New Hampshire. This case was promptly reported to the New Hampshire Cattle Commission.

Besides the above, railroad agents, local inspectors and others have reported 265 cattle brought into the State without permission; 104 of these were accompanied by satisfactory certificates of test, 1 was a calf requiring no test, 1 was returned from out-of-State pasture, 27 were for beef, and the remainder, 132, were looked up in every case and tested by agents of the Cattle Bureau.

The tuberculin used by the Cattle Bureau is furnished by the United States Bureau of Animal Industry, with the understanding that it is for State use only, that all tests made will be reported in writing, and that the result of the autopsies on reacting animals will be given.

The *third division* of the work for the eradication of tuberculosis comprises that which is known as *voluntary request work*. This is testing entire herds at the written request of the owners. With the exception of two or three small herds, this has been done only upon the owners signing an agreement stating that they will take what the butcher will allow for animals so slightly diseased as to pass the slaughter house inspection, the State paying only for animals that are so badly diseased that the carcasses have to be rendered. The exceptions were small herds, where the cows were not in beef condition, and where only a small number were likely to react. In cases where the owners agree to accept the butcher's returns upon animals that may safely be used for food, much of the burden falls on the owners, as

cows will not bring their full value if killed for beef when in milking condition.

Below is given a report of the herds and cattle tested at the request of owners:—

Number of herds,	. . . . .	16
Number of animals,	. . . . .	438
Number condemned and rendered,	. . .	153
Number condemned, no award,	. . .	95
Number that did not react,	. . . .	190
	—	438

Of the number that did not react, 1 was killed at owner's request, and found to be diseased.

In 1902, 17 herds were tested, but they were smaller, and contained only 274 animals. Five of the 16 herds tested in 1903 were retests on herds tested the year before, or the completion of work undertaken the previous year, therefore only 11 belonged to new owners. Four herds were found to be free from disease; in the herds where disease was found some of them were badly infected, and a very large per cent of the animals reacted.

The problem of how best to deal with bovine tuberculosis in order to further diminish it is an important and serious one. At present the law requires owners to be compensated for cattle killed because of tuberculosis, the appraisal being based upon the apparent market value of the animal at the time it is condemned, the limit of value on any one creature being placed at \$40. The cattle quarantined by local inspectors on suspicion of having tuberculosis are generally found to be animals that are badly diseased, unsafe to produce milk for human food and unfit to be utilized for beef; and such animals should be killed, to protect the public health, as they are a menace to their stable companions. At the same time, taking a tuberculous animal here and there, perhaps only one or not over two or three from any one owner, does not seem to diminish the amount of tuberculosis perceptibly. Many owners are careless in disinfecting the place where the animal destroyed stood; and, even when the disinfection is thorough, there are other slightly tuberculous creatures left,

which develop further symptoms of disease later, until they are in a condition to infect any new purchases that may have been free from disease when put in the stable, but in time arrive at a condition where they have to be quarantined and killed.

During 1903, 690 more cattle have been quarantined by the local inspectors of animals on suspicion of being tuberculous than during the previous year; 322 more have been killed because of this disease, to say nothing of the 326 released from quarantine for lack of funds. If anything, it would seem that ground was being lost in the eradication of tuberculosis among cattle, rather than being gained, under the present system of dealing with this malady. If the money now expended in paying for bad cases of tuberculosis could be used for testing and cleaning up entire herds where the disease exists, more permanent headway might be made towards diminishing its frequency.

This testing could be commenced in cattle-raising districts in the western part of the State, where there are only two or three bad herds perhaps in many of the towns, which are a constant source of danger to the neighboring ones; and, as these localities were cleaned up, work could later be undertaken on the same plan in the infected localities in the eastern part of the Commonwealth. If such measures were adopted, the State ought to disinfect the stables where cattle were killed, and the owner should be required to sign a binding agreement to buy only tested cattle in the future. A second and perhaps a third test might be made by the State the following year or two, to be sure that no diseased animals remained to infect new purchases, and condemned cattle should be paid for from the Cattle Bureau's appropriation. After it appeared certain that a herd was freed from the infection, the owner should be required to maintain it in a state of health thereafter. Any intelligent farmer can learn to use tuberculin himself, and any one who now wishes to can easily keep a tested herd, if he chooses, without State aid. To do this with appropriations no larger than those of the past few years would require a change in the law, providing that individual animals now quarantined by the

local inspectors shall be killed, where the public good requires it, without appraisal or payment; or else more money should be appropriated. A cow so badly diseased with tuberculosis as to be a menace to the public health or a source of danger to other cattle is in reality a worthless piece of property; and there seems to be no more reason for paying for such an animal than there is for paying for a horse with glanders, for which the owner receives nothing when it is killed under the provisions of the sanitary laws of the State.

While the present law remains in force, the larger part of the appropriations of the Cattle Bureau will be required to pay for tuberculous cattle quarantined by the local inspectors, and to employ agents to examine, appraise and kill them, leaving only a small part of the appropriations for doing other work. The only other way in which to make more headway and do any permanent work under the present requirements would be to have appropriations sufficiently large to take care of all the bad cases of bovine tuberculosis, and leave a large enough margin with which to properly carry out the other duties required of the Cattle Bureau.

While it is a partial protection to the health of milk and meat consumers to kill badly diseased animals within the limits of the State, yet it does not afford any protection to those using milk from herds in adjoining States, many of which are kept in localities where bovine tuberculosis may prevail as extensively as it does in Massachusetts.

A remedy for this might be to license all milk producers furnishing a public milk supply to people in this State, whether the farms were in Massachusetts or elsewhere; and to refuse licenses to all persons who did not comply with proper requirements for the health of their herds and the cleanliness and sanitary condition of their surroundings.

Whatever course may be pursued in the future, it seems best to continue the requirement of a tuberculin test on all cattle brought into this State for dairy or breeding purposes from other States; as a continual supply of healthy cattle from outside will tend to diminish the prevalence of the disease in this Commonwealth, and give those who realize

the importance of so doing an opportunity of buying healthy cattle. Any relaxation of these regulations would also make Massachusetts a dumping ground for diseased cattle from other States. It is regrettable that so many of the cattle coming into this State in a healthy condition are destined to go to dairies where in time they will become infected with this bovine scourge. At present the law does not allow the testing of cattle with tuberculin by the State except animals brought in from without the State, or at Brighton, Watertown and Somerville, and animals that are considered tuberculous by a competent veterinary surgeon; in other cases it cannot be done without the written consent of the owner. If an attempt were to be made to clean up dangerous herds in localities where they were a source of danger to the neighboring cattle, it would be well to amend the law so as to give the Chief of the Cattle Bureau authority to have any herd tested in which one or more tuberculous animals, which could be condemned upon a physical examination, were found to be present.

Many farmers do not seem to realize the importance of keeping incipient tuberculosis out of their herds, even when an opportunity for doing so offers itself, as illustrated by answers to the following letter, sent to owners whose herds were killed because of foot and mouth disease, and whose barns were thoroughly disinfected:—

BOSTON, Dec. 24, 1903.

DEAR SIR:—Last winter your herd was killed by the United States Bureau of Animal Industry, and your premises thoroughly disinfected, giving you an opportunity to restock your farm with healthy cattle. I would like very much if you would be so kind as to inform me what pains you have taken to buy cattle that have been tested with tuberculin, so as to be sure that they were absolutely healthy when you restocked your farm, or whether you have bought cattle without taking any particular precautions to be sure that they were free from any form of contagious disease, particularly tuberculosis.

An early reply will be very much appreciated.

Yours truly,

AUSTIN PETERS,
Chief of Cattle Bureau.

There were 107 letters sent and 56 replies received, many of them very interesting. Of the 56 answering, there are 4 who state that their farms have not been restocked and 1 who has restocked only with dry cows, which he sells when they come in, as he finds that it is useless to keep milch cows, as the milk still tastes of disinfectants from his barn, and he cannot find a market for it. The latter writer thinks it would have been preferable to have had his barn burned than to have disinfected it as it was done; he says he thinks one cow died last spring from chloride of lime poisoning. One of the 4 who has not yet stocked up again has not done so because the barn still smells so of disinfectants that he does not care to put cattle in.

About a dozen of the other writers intend to keep only tested cattle; some have taken especial pains to have their animals tested; others buy at Brighton, but have taken pains to buy out-of-the-State cows tested there, and do not intend to buy any that have not been tested.

The other 39 replies state that the writers have not taken any particular pains to buy tested animals; some have bought cattle from without the State that were tested, and then bought a few from neighbors that were not,—some of which, if they should develop disease, will prove sources of infection to the tested ones in time; all state that they have taken particular pains, however, to buy animals that are to the best of their judgment healthy from the stand-point of a careful physical examination. Several do not have any faith in the tuberculin test, and a few have a strong prejudice against it. Several are cow dealers, and state that they cannot avoid occasionally getting a tuberculous cow in the way of trade; but that they have such animals kept away from the rest, and notify the local inspector to quarantine them, so that they may be appraised and killed by an agent of the Cattle Bureau.

The owners of a large milk farm in Westborough state that they intend to keep only tested cattle, but when they restocked it was impossible to buy cows from their neighbors, subject to the test, for various reasons. One of them writes as follows:—

The more ignorant farmers said that they would not have the test applied, because they thought it injured the health of the animals; another refused to sell subject to the test, because the purchaser would get the clean animals, and the seller the tuberculous ones,—not thinking it would be any advantage to him to find out which of his animals were diseased; and others were willing to sell subject to the test, but at such a large advance in price that we thought it cheaper to buy cattle untested, and test them ourselves. This we have done, and now have a herd in the disinfected barns that is free from disease.

From most of the answers received, therefore, it appears that the majority of owners are satisfied to buy cattle that appear to be healthy, from a physical stand-point, without any special reference to whether they will pass a tuberculin test or not.

From what has been said above it is not intended to give the idea that cleanliness, sunlight and ventilation are to be forgotten, as these are of the utmost importance in assisting to maintain the health of the herd.

FOOT AND MOUTH DISEASE.

The outbreak of foot and mouth disease, which caused so much trouble and excitement a year ago, has been entirely eradicated; all restrictions upon the movement of cattle, sheep, other ruminants and swine in the New England States have been removed, and shipments from the port of Boston resumed. The conditions now existing are exactly as they were prior to the appearance of this disease.

At the time of the last semiannual report to the Board of Agriculture, last June, it was stated that the foot and mouth disease seemed to be practically extirpated, and soon after, July 15, the following order was approved by the Governor and Council, stating that the disease was believed to be eradicated, and all restrictions imposed upon the moving of animals and merchandise within the limits of this Commonwealth were removed; and orders relating thereto were revoked:—

CATTLE BUREAU ORDER, NO. 11.

COMMONWEALTH OF MASSACHUSETTS,
CATTLE BUREAU OF THE STATE BOARD OF AGRICULTURE,
STATE HOUSE, BOSTON, July 15, 1903.

*To Transportation Companies, the Brighton Stock Yards Company, and
All Persons whom it may concern.*

By virtue of the power and authority vested by law in the Cattle Bureau of the State Board of Agriculture, under the provisions of chapter 90 of the Revised Laws and chapter 116 of the Acts of 1902, you are hereby notified that foot and mouth disease, which is a contagious disease and is so recognized under the laws of this Commonwealth, is no longer known to exist in this State, and it is believed that it has been entirely eradicated. Therefore, the orders of the Chief of the Cattle Bureau, approved by the Governor and Council Nov. 26 and Dec. 1, 1902, Feb. 18, March 18 and May 13, 1903, closing the Brighton market, forbidding auctions and public sales and the transportation of neat cattle, sheep, other ruminants and swine, hay, straw, grain bags, cattle hides, calf skins, horns, hoofs, bones and manure in certain cities and towns and sections of this Commonwealth, and restricting the use of certain premises where the disease has existed, are hereby revoked.

The Brighton market may be reopened, and animals moved as formerly within the limits of the State.

The regulations of the Cattle Bureau concerning the importation of neat cattle into Massachusetts previous to the appearance of the foot and mouth disease in the autumn of 1902 still remain in force, except as provided for in chapter 322, Acts of 1903; that is, the orders approved in Council April 23, 1902, and Sept. 10, 1902, as modified by this order, now provide as below:—

1. No neat cattle brought from any State or Territory of the United States, the District of Columbia, Canada or any other country without the limits of this Commonwealth shall be brought within the limits of this Commonwealth, except for delivery directly to the Union Stock Yards in the town of Watertown, the Boston & Albany Stock Yards in Brighton within the city of Boston, or the premises of the New England Dressed Meat and Wool Company in the city of Somerville, except upon a permit signed by the Chief of the Cattle Bureau; and no neat cattle so brought for delivery at any of said points shall be unloaded, except as provided in paragraph 3, at any point other than the said Boston & Albany Stock Yards in Brighton, the Union Stock Yards in Watertown, or the New England Dressed Meat and Wool Company in Somerville.

2. All neat cattle brought within the limits of this Commonwealth from any place designated in paragraph 1 hereof, except

for delivery as provided in the preceding paragraph, must be accompanied by a permit issued by the Chief of the Cattle Bureau.

3. If, for any cause, any such neat cattle are received by any of your agents within the limits of this Commonwealth at any place other than the Union Stock Yards in Watertown, the Boston & Albany Stock Yards in Brighton, or the New England Dressed Meat and Wool Company in Somerville, not accompanied by a permit, as provided in paragraph 2 hereof, you will immediately notify this office, giving the place where said animals were received for shipment, the name of the consignee and destination of said animals. You will not remove said animals or permit them to be removed from the car or vehicle in which they are contained without permission from the Chief of the Cattle Bureau or one of his agents; except that if, by reason of the crowded condition of the car, or because of the long confinement of said animals within the same, or for accident or otherwise, it is deemed expedient by you or your agent to unload the same, such animal or animals may be removed by you from said car or vehicle without permission; but in such case you will notify this office, and you will not allow said animal or animals to go out of the possession of your agent or off of your premises where said animals are unloaded except upon obtaining such permission.

4. All neat cattle brought within the limits of the premises in Brighton, Watertown and Somerville, designated in paragraph 1 hereof, are hereby declared to be quarantined, until released by an agent of the Bureau.

5. All cattle except those for immediate slaughter, or calves under six months old, must be tested with tuberculin by a person approved by the Chief of the Cattle Bureau, either prior to shipment or after arrival at destination, unless permission to omit the test is given by the Chief of the Bureau, for some good reason. Cattle brought to the quarantine stations at Watertown, Brighton and Somerville, upon which a test is required, will be held and tested by the agent of the Cattle Bureau in charge of these stations, free of expense to citizens of Massachusetts; a fee sufficient to cover the cost will be charged other persons. Cattle upon which a test is required, coming to points outside the limits of the quarantine stations, will be tested by an agent of the Cattle Bureau, free of expense to citizens of Massachusetts, and at the expense of other persons, unless accompanied by a certificate of test satisfactory to the Chief of the Cattle Bureau. All such cattle are to be held in quarantine at the expense of the owner, until released by order of the Chief of the Cattle Bureau. Cattle returning from out-of-the-State pastures will not be required to have a

test if they have not been out of the State over six months. Animals under control of the United States Bureau of Animal Industry, Department of Agriculture, intended for export, are not included in this order. Animals believed to be diseased will be killed.

6. Any person violating the provisions of this order will be punished as provided in section 29 of chapter 90 of the Revised Laws.

7. Inspectors of animals throughout the Commonwealth shall publish this order by posting a printed copy of the same in at least three public places within the limits of their respective cities or towns.

This order shall take effect upon its approval.

AUSTIN PETERS,
Chief of Cattle Bureau.

Approved in Council, July 15, 1903.

E. F. HAMLIN,
Executive Secretary.

Since the date of the above order but one outbreak of this disease has occurred, and that was found to be entirely separate and distinct from the outbreak of the preceding winter, and its occurrence may serve to shed some light upon the possible manner in which foot and mouth disease was originally imported into the country. This last outbreak occurred in Wakefield in August, a full account of which will be given later in this report. Before doing so, however, it seems best to give some of the details of further measures taken for the suppression of the disease since Jan. 1, 1903, all of the steps taken up to that date being described in the second semiannual report of the Chief of the Cattle Bureau to the State Board of Agriculture.

January 1 the following notice was sent to owners of animals quarantined because of foot and mouth disease, copies also being sent to inspectors of animals in towns where it existed, to post in public places:—

COMMONWEALTH OF MASSACHUSETTS,
CATTLE BUREAU OF THE STATE BOARD OF AGRICULTURE,
STATE HOUSE, BOSTON, Jan. 1, 1903.

NOTICE.

[To be distributed among owners who have had cattle quarantined on account of foot and mouth disease, and to be posted in public places.]

The attention of cattle owners and other interested persons is called to the fact that the quarantine of premises infected with foot and mouth disease is not confined to cattle, sheep and swine

alone, but includes such materials as hay, straw, grain, manure, grain bags and utensils. Where the animals are killed by the United States Bureau of Animal Industry, it does not imply that the material is released from quarantine until the premises have been properly disinfected and the owner has permission from the Chief of the Cattle Bureau of the State Board of Agriculture to remove any materials from the building.

Grain men are forbidden to remove grain bags from premises where the disease exists, until the same have been properly disinfected.

As the killing of cattle on some farms will probably cause the farm hands to seek employment in other places in some instances, all cattle owners in infected localities are advised of the danger of hiring men who have been working on infected premises, unless proper disinfecting measures have been taken. All overalls, jumpers and other outside garments that can be washed should be washed in hot water containing five per cent of crude carbolic acid. Rubbers and rubber boots should be washed off with the same solution. Old boots and hats, and old woolen clothes and the like, that cannot be properly disinfected, should be burned, and not taken onto any person's farm that is free from disease. The men should also be made to thoroughly wash their hands with soap and warm water, trim and clean the finger nails, and then rinse their hands thoroughly with a five per cent solution of crude carbolic acid in water. If the men take proper precautions in going from one place to another, there will be no danger in carrying the disease in this way; but if these precautions are not taken, the danger exists.

Cattle owners are also advised, as a further preventive measure, to prohibit the trespassing of persons from other farms upon their premises, especially butchers travelling from place to place in search of beef cows and veal calves. The latter class of men are especially dangerous, and their access to premises should be forbidden by owners in every instance.

AUSTIN PETERS,
Chief of Cattle Bureau.

Soon after it became apparent that rules and regulations were necessary as to the use of buildings and their contents, as the animals that were not killed recovered, or where they were killed and the premises were disinfected by the disinfecting corps of the United States Bureau of Animal Industry, or similar squads organized by the Chief of the Cattle

Bureau of the State Board of Agriculture. Accordingly the following notice was sent to owners or occupants of premises where foot and mouth disease existed :—

COMMONWEALTH OF MASSACHUSETTS,
CATTLE BUREAU OF THE STATE BOARD OF AGRICULTURE,
STATE HOUSE, BOSTON, Jan. 7, 1903.

To All Persons whom it may concern.

By virtue of the power and authority vested by law in the Cattle Bureau of the State Board of Agriculture, under the provisions of chapter 90 of the Revised Laws, and chapter 116 of the Acts of 1902, and in accordance with an order approved by the Governor and Honorable Council Dec. 1, 1902, giving the Chief of the Cattle Bureau the authority to make necessary rules and regulations for the eradication of foot and mouth disease, it is hereby ordered :—

1. That barns, stables, piggeries and pens where cattle have been killed because of foot and mouth disease shall not have any new cattle, sheep, other ruminants or swine placed in them until six weeks after the animals have been killed, and not until the premises have been disinfected, and permission so to do has been obtained from the Chief of the Cattle Bureau.

On premises where infected animals have recovered and have not been killed, no new cattle, sheep, other ruminants or swine shall be introduced until six weeks after the premises have been disinfected ; and no cattle, sheep, other ruminants or swine shall be removed from such premises until sixty days after the premises have been disinfected, and permission has been obtained from the Chief of the Cattle Bureau to do so.

2. No hay, straw, forage, grain, utensils or other material, except manure, shall be removed from premises where animals which have had foot and mouth disease have been in quarantine until sixty days after the premises have been disinfected, and not then until permission has been obtained from the Chief of the Cattle Bureau to do so.

3. Manure from cattle, sheep, other ruminants or swine which have been infected with foot and mouth disease is to be piled in a compact heap and then covered to a depth of two feet with horse manure, or, if horse manure is not available, the surface of the heap is to be liberally mixed with chloride of lime. After two weeks the manure can then be removed with safety, and it is not to be removed until this length of time has elapsed.

It is recommended that, where the animals have not been killed, the hay, forage and grain in the buildings be fed to the animals remaining upon the place.

It is advised that, when the owners purchase new stock to replace animals destroyed, only a few animals be purchased at first, and kept under observation two weeks; if at the expiration of that time they remain healthy, additional live stock may be added. If foot and mouth disease appears among new animals placed upon premises where the disease has existed, the Chief of the Cattle Bureau is to be immediately notified.

Failure to comply with these directions renders the violator liable to the penalties provided for by law under sections 11 and 29 of chapter 90 of the Revised Laws.

AUSTIN PETERS,
Chief of the Cattle Bureau.

How admirably these regulations worked is seen by the results. There has not been a single recurrence of the disease on any premises or any adjoining premises, as a consequence of stocking up again with new animals, moving manure or selling hay, with but one possible exception. This exception was the two yoke of oxen in Quincy killed last spring, which were kept near a place where the cattle were killed during the winter. These oxen were accustomed to drink at a little brook at a point a short distance below where it ran through the barnyard of the premises where the cattle were killed; and when the frost was coming out, and the owner was given permission to move out the manure, the brook seems to have become contaminated and the oxen were infected. The owner of the premises where the cattle had been previously killed was directed not to haul out any more manure to any distance from the buildings, but to pile it near by and compost it with lime and chloride of lime, and to let it remain some weeks longer. This was done, with the result that when it was taken away later no further trouble followed. This work was paid for by the State. In two instances owners of premises that had been infected bought oxen to do the spring work, with no untoward results.

Later in the winter, as the infected area became more clearly defined, it was decided to issue an order making a portion of the State a quarantined district. This was seen to be necessary, as it was found that manure was shipped to points outside, and also that it was the practice among grain dealers in infected towns to send empty grain bags to wholesale grain men at distant points, and when these bags were

refilled they might be sent to other points, and possibly carry the disease to some new locality. It does not seem at all unlikely that foot and mouth disease was carried in grain bags from a dealer's in Fitchburg to Foxborough; and the owner of the herd in Foxborough was on the point of sending these bags away at the time his herd was quarantined and killed, and, if an agent of the Cattle Bureau had not taken possession of them and burned them in the nick of time, further spread of the disease might have resulted.

The following order was approved by the Governor and Council February 18: —

CATTLE BUREAU ORDER, NO. 8.

COMMONWEALTH OF MASSACHUSETTS,
CATTLE BUREAU OF THE STATE BOARD OF AGRICULTURE,
STATE HOUSE, BOSTON, Feb. 17, 1903.

To Transportation Companies and All Persons whom it may concern.

By virtue of the power and authority vested by law in the Cattle Bureau of the State Board of Agriculture, under the provisions of chapter 90 of the Revised Laws and chapter 116 of the Acts of 1902, you are hereby notified that foot and mouth disease, which is a contagious disease and is so recognized by the laws of the Commonwealth, exists to an alarming extent among cattle, sheep and swine in some sections of this State.

You are hereby further notified that in order to prevent its spread this Bureau has issued the following order, to continue until revoked: —

1. No neat cattle, sheep, other ruminants or swine are to be shipped, transported or driven into or across that portion of the State bounded on the west and north by North Attleborough, Foxborough, Norfolk, Medfield, Sherborn, Framingham, Southborough, Westborough, Marlborough, Sudbury, Stow, Boxborough, Littleton, Westford, Chelmsford, Billerica, Burlington, Lexington, Arlington, Medford, Malden and Revere, and on the east and south by Quincy, Braintree, Randolph, Stoughton, Sharon, Mansfield and North Attleborough, and including the territory covered by the above-named towns, without a permit from the Chief of the Cattle Bureau.

2. No hay, grain bags or manure are to be removed from the above territory without a permit from the Chief of the Cattle Bureau.

Nothing in this order modifies the existing quarantine rules and regulations in force in towns at present declared by the Chief of the Cattle Bureau to be infected.

The only exception to the above order is that cattle, sheep, other

ruminants and swine, intended for immediate slaughter, may be conveyed by rail to the following points from without the infected area: the Watertown Stock Yards, the Brighton Abattoir, the New England Dressed Meat and Wool Company, the slaughter house of Austin Davis at Concord Junction, the Boston Packing and Provision Company, the J. P. Squire Company and the North Packing and Provision Company.

Persons disobeying orders issued by the Chief of the Cattle Bureau and approved by the Governor and Council are subject to a penalty as provided in section 29 of chapter 90 of the Revised Laws; that is, a fine not exceeding \$500, or imprisonment for not more than one year. This applies not only to this order, but to all previous orders issued for the eradication of foot and mouth disease.

This order shall take effect upon its approval.

AUSTIN PETERS,
Chief of Cattle Bureau.

Approved in Council, Feb. 18, 1903.

E. F. HAMLIN,
Executive Secretary.

This order was faulty because the word "from" was inadvertently omitted in paragraph 1, where it says, "No neat cattle, sheep, other ruminants or swine are to be driven into or across" the quarantined district. This was amended by another order, approved by the Governor and Council March 18, inserting the word "from" between "driven" and "into." Practically this omission made no difference, as the towns surrounding the quarantined district were all posted, and persons were already forbidden to move cattle, sheep or swine on the highways without a permit, or to turn them on any unfenced land.

The order establishing a quarantine district did not include all the towns where the disease had existed, but it seemed to be sufficient, as it made a line running from the boundary of Rhode Island to Quincy Bay on one side, and on the other it extended from the Rhode Island boundary almost to New Hampshire. While cases had occurred in Attleborough, Bridgewater, West Bridgewater, Grafton, Barre, Harvard, Methuen, Andover, North Andover and Danvers, these were early in the outbreak, and keeping these towns posted until all danger was past seemed to be sufficient.

At this time it was believed that pet animals, such as cats and dogs, might carry the disease from place to place, and possibly in some instances they did; also that some persons who had had disease on their premises were careless in going to neighbors in the same clothing and boots that they wore around their own barns. An order was therefore approved February 18, giving the Chief of the Cattle Bureau authority to have small animals destroyed if they were not kept under proper restraint by their owners, and also to forbid certain persons entering their neighbors' premises; but happily it was not necessary to take any action under this order, as there were very few new cases discovered after its approval, and the authority it conferred seemed to have sufficient moral effect. The following is a copy of the order:—

CATTLE BUREAU ORDER, NO. 7.

COMMONWEALTH OF MASSACHUSETTS,
CATTLE BUREAU OF THE STATE BOARD OF AGRICULTURE,
STATE HOUSE, BOSTON, Feb. 17, 1903.

To All Persons whom it may concern.

By virtue of the power and authority vested by law in the Cattle Bureau of the State Board of Agriculture, under the provisions of chapter 90 of the Revised Laws and chapter 116 of the Acts of 1902, you are hereby notified that foot and mouth disease, which is a contagious disease and is so recognized by the laws of the Commonwealth, exists to an alarming extent among cattle, sheep and swine in some sections of this State.

You are hereby further notified that in order to prevent its spread this Bureau has issued the following order:—

1. In localities where foot and mouth disease exists, the Chief of the Cattle Bureau may cause dogs, cats or other small animals running at large to be destroyed, if their owners refuse or neglect to place them under proper restraint after being requested to do so by the Chief of the Cattle Bureau or its authorized agents.

2. Owners or lessees of premises and the employees where animals have been that were infected with foot and mouth disease are hereby forbidden to enter upon premises where neat cattle, sheep, other ruminants or swine are kept, until the infected premises and the boots and clothing of the above-mentioned persons have been properly disinfected, and it is declared safe by the Chief of the Cattle Bureau or its agents for them to enter places where uninfected animals are kept.

Persons disobeying this order are subject to the penalties provided in section 29 of chapter 90 of the Revised Laws.

This order takes effect upon its approval.

AUSTIN PETERS,
Chief of Cattle Bureau.

Approved in Council, Feb. 18, 1903.

E. F. HAMLIN,
Executive Secretary.

Toward the end of April foot and mouth disease had so nearly disappeared that it was feared that inspectors and agents, as well as transportation companies, would become lax in the enforcement of the order of February 18, as amended March 18, establishing a quarantine district; therefore, under date of April 25 a notice was sent them, including a copy of the order, stating that it was still in force, and that its provisions must continue to be complied with.

Early in May two herds were found in Framingham, by agents of the United States Bureau of Animal Industry, which were believed to be infected with foot and mouth disease; and it was thought best to issue another order relating to the quarantine district, so as to include Millis and Ashland, and also to modify section 2 so that baled hay and baled straw could be sent to points outside, and also to include other animal products not mentioned in the earlier orders. For this purpose the following order was approved May 13:—

CATTLE BUREAU ORDER, NO. 9.

COMMONWEALTH OF MASSACHUSETTS,
CATTLE BUREAU OF THE STATE BOARD OF AGRICULTURE,
STATE HOUSE, BOSTON, May 13, 1903.

To Transportation Companies and All Persons whom it may concern.

By virtue of the power and authority vested by law in the Cattle Bureau of the State Board of Agriculture, under the provisions of chapter 90 of the Revised Laws and chapter 116 of the Acts of 1902, you are hereby notified that foot and mouth disease, which is a contagious disease and is so recognized by the laws of the Commonwealth, has existed to an alarming extent among cattle, sheep and swine in some sections of this State.

You are hereby further notified that in order to prevent its spread this Bureau has issued the following order, to continue until revoked:—

1. That portion of the State bounded on the west and north by North Attleborough, Foxborough, Norfolk, Millis, Sherborn, Ashland, Southborough, Westborough, Marlborough, Sudbury, Stow, Boxborough, Littleton, Westford, Chelmsford, Billerica, Burlington, Lexington, Arlington, Medford, Malden and Revere, and on the east and south by Quincy, Braintree, Randolph, Stoughton, Sharon, Mansfield and North Attleborough, and including the territory covered by the above-named towns, is hereby declared to be a quarantined district, and no neat cattle, sheep, other ruminants or swine are to be shipped, transported or driven from, into or across said district without a permit from the Chief of the Cattle Bureau.

2. No hay or straw (excepting baled hay and baled straw originally brought in from without the quarantined district), grain bags, cattle hides, calf skins, horns, hoofs, bones or manure are to be removed from the above territory without a permit from the Chief of the Cattle Bureau.

Nothing in this order modifies the existing quarantine rules and regulations in force in towns at present declared by the Chief of the Cattle Bureau to be infected.

The only exception to the above order is that cattle, sheep, other ruminants and swine, intended for immediate slaughter, may be conveyed by rail to the following points from without the infected area: the Watertown Stock Yards, the Brighton Abattoir, the New England Dressed Meat and Wool Company, the slaughter house of Austin Davis at Concord Junction, the Boston Packing and Provision Company, the J. P. Squire Company and the North Packing and Provision Company.

Persons disobeying orders issued by the Chief of the Cattle Bureau and approved by the Governor and Council are subject to a penalty as provided in section 29 of chapter 90 of the Revised Laws; that is, a fine not exceeding \$500, or imprisonment for not more than one year. This applies not only to this order, but to all previous orders issued for the eradication of foot and mouth disease.

Inspectors of animals in cities and towns within the limits of, and abutting upon, the quarantined district shall publish this order by posting a printed copy of the same in at least three public places within the limits of their respective cities or towns.

This order shall take effect upon its approval.

AUSTIN PETERS,
Chief of Cattle Bureau.

Approved in Council, May 13, 1903.

E. F. HAMLIN,
Executive Secretary.

At the same time the following order was approved, removing the quarantine of Massachusetts against Rhode Island, because the United States Secretary of Agriculture had declared the latter State to be free from foot and mouth disease :—

CATTLE BUREAU ORDER, NO. 10.

COMMONWEALTH OF MASSACHUSETTS,
CATTLE BUREAU OF THE STATE BOARD OF AGRICULTURE,
STATE HOUSE, BOSTON, May 13, 1903.

To Transportation Companies and All Persons whom it may concern.

By virtue of the power and authority vested by law in the Cattle Bureau of the State Board of Agriculture, under the provisions of chapter 90 of the Revised Laws and chapter 116 of the Acts of 1902, you are hereby notified that the order of the Cattle Bureau of the Massachusetts State Board of Agriculture, approved Nov. 19, 1902, forbidding bringing neat cattle, sheep or swine from Rhode Island into Massachusetts, because of the prevalence of foot and mouth disease, is hereby revoked, as the Secretary of the United States Department of Agriculture has declared the State of Rhode Island to be free from foot and mouth disease.

Persons can bring such animals into Massachusetts, subject to the regulations of the Cattle Bureau ; that is, persons wishing to bring neat cattle into Massachusetts must obtain a permit from the Chief of the Cattle Bureau before doing so. All neat cattle brought from Rhode Island into Massachusetts are subject to the tuberculin test, excepting calves under six months old or beeves for immediate slaughter.

Inspectors of animals throughout the Commonwealth shall publish this order by posting a printed copy thereof in one or more public places within the limits of their respective cities or towns.

This order shall take effect upon its approval.

AUSTIN PETERS,
Chief of Cattle Bureau.

Approved in Council, May 13, 1903.

E. F. HAMLIN,
Executive Secretary.

These two orders of May 13 were the last found necessary in connection with foot and mouth disease, until the final order of July 15, 1903, was issued, stating that the disease had been stamped out, and that no further restrictions were necessary on account thereof.

Friday morning, March 6, Mr. C. A. Dennen, the agent of the Cattle Bureau in charge of the stock yards at Brighton, Watertown and Somerville, telephoned the Chief of the Cattle Bureau that some cheap beef cattle had just arrived from Bedford, N. H., which appeared to be ailing, and that he was holding them in the pen into which they had been unloaded at the Watertown yards, and he had also forbidden moving the car from the siding on which it stood, and asking the Chief to come over as soon as possible. Mr. Dennen was instructed to telephone Dr. Bunker of Newton to come at once, and the Chief also drove over immediately.

The cattle consisted of a lot of eight cows, a yoke of steers and a bull, shipped by E. R. French of Bedford, N. H., and consigned to J. J. Kelly at the Brighton Abattoir. Several of the animals upon examination showed evidences of having had foot and mouth disease recently, some of the cases were evidently of not over two weeks' standing, and some may have dated back a month.

The United States authorities were notified at once, and the animals were immediately killed in the pen where they were and removed by a renderer, and the pen, as well as the car in which they came, disinfected by the officials of the United States Bureau of Animal Industry.

The following day an order was issued by the United States Secretary of Agriculture, declaring New Hampshire to be quarantined, and forbidding the transportation of any neat cattle, sheep, other ruminants or swine from or across that State.

An investigation by the officials of the United States Bureau of Animal Industry showed a somewhat extensive outbreak of foot and mouth disease in the towns of Bedford, New Boston, Weare, Henniker, Dunbarton, Goffstown, Hookset, Hemstead and the city of Manchester, which had evidently been in existence for some months. Early in the winter foot and mouth disease had been found in three or four herds in Salem, Hudson and Hancock, N. H., but these had been killed and the buildings disinfected, and the State was supposed to be free from the disease: and permits had been given by the Chief of the Cattle Bureau to bring cattle

from New Hampshire into Massachusetts, little thinking that such a hotbed of the malady existed there.

If it had not been for the prompt action taken by the agent of the Cattle Bureau of the Massachusetts State Board of Agriculture at the Watertown yards, this outbreak might have continued for some time longer before being discovered, and assumed much larger proportions before the attention of the United States authorities was called to it.

By the last of December, 1902, or first of January, 1903, most of the herds where foot and mouth disease was present had been discovered and quarantined, and were killed by the agents of the United States Bureau of Animal Industry; and the buildings where the animals were killed, or were allowed to remain because they had recovered, were being disinfected as rapidly as possible by the disinfecting squads of the Bureau of Animal Industry; but there was so much of this work to be done that it was decided that it would expedite matters and lessen the danger of the spread of the disease if the work were supplemented by having some of the buildings disinfected by the Cattle Bureau of the State Board of Agriculture. Disinfecting squads were therefore organized in five different localities, each squad being in charge of a veterinarian, and consisting of three or four men, with a large tree-spraying force pump and hose, and a supply of lime and disinfectants. This work was continued through January and well into February, when so few new herds having the disease were discovered that it was possible for the United States authorities to immediately disinfect buildings as soon as the animals in them were slaughtered, when this work was relinquished by the Cattle Bureau's agents, except that in March some work was done by the State in disinfecting the large stock barn at Brighton and the premises of the New England Dressed Meat and Wool Company at Somerville. The yards at Brighton and Watertown were disinfected by the disinfecting corps of the United States Bureau of Animal Industry.

In Chelsea, Everett and that part of Revere where the original outbreak occurred, all the premises where cattle were kept were disinfected, as a large proportion of the

population were foreigners, and it was impossible to be sure where the disease had, or had not, existed.

After the disinfection work was completed, the sections of the State where foot and mouth disease had prevailed were divided into districts, and an agent of the Cattle Bureau was placed in charge of each, to see that there was no recurrence of the trouble on any of the premises where it had prevailed, and to enforce rules and regulations of the Cattle Bureau relative to driving or transporting cattle, sheep or swine in posted towns, or moving them in or out of the quarantined portion of the State. This work was continued until the order of July 15 went into effect, removing all the restrictions.

While the moving of all cattle, sheep or swine was prohibited in posted towns, or from, into or across the quarantined district, without a permit from the Chief of the Cattle Bureau, it was found to be impossible to absolutely prevent the moving of these animals in all instances without causing great inconvenience or even hardship, and it became necessary to have a form of permit printed giving persons permission to move animals and merchandise where it was safe to do so. At first all permits were signed by the Chief of the Cattle Bureau, and issued to agents to use at their discretion, in book form, with a stub to fill out, showing what the permits were given for, the stubs to be returned to the office when the book was used up. Later, the books were issued with the Chief's name printed on each permit, to be countersigned by the agent granting the permit. A few of the more reliable inspectors of animals in certain towns were also supplied with these books. Permits had to be given for moving cattle, swine and sheep, as well as for shipping manure, grain bags, hides, etc. The total number of these permits issued for various purposes during the continuance of the restrictions was about 12,000. In towns where there was any danger of a further spread of foot and mouth disease, permits for moving animals required them to be carried on a sled or wagon. Never in the history of Massachusetts have so many cattle enjoyed wagon or sleigh rides as they did during the winter of 1902 and 1903, and it is to be

hoped that no such necessity for their doing so will ever occur again.

After the order of February 18 went into effect, forbidding the removal of grain bags from the quarantined district, it was found necessary to disinfect them before granting permits for such removal. Bags were shipped by grain dealers to Providence, Hartford, North Wilbraham, Fitchburg, and even to Buffalo, and it can readily be seen how dangerous this was unless the bags were disinfected.

Accordingly, about the first of March the services of Mr. Willard E. Ward, of the Ward Apparatus Company of Brookline, were secured to fumigate with formaldehyde gas all grain bags and bagging for persons who wished to ship them out of the quarantined district.

From March 1 until the necessity for doing so no longer required it Mr. Ward disinfected between 82,000 and 84,000 grain bags, a number of tons of mixed rags and bagging, and 3,300 pounds of bagging. In addition, several hundred pounds of old bags and bagging were bought from their owners and burned, as too dirty and valueless to be worth the expense of disinfecting.

After the rules and regulations in posted towns had been in force two or three months, some cattle owners and drovers found the restrictions irksome, and, as the disease seemed to be subsiding, thought no further danger existed, and commenced moving cattle without resorting to the formality of obtaining permits. In order to enforce these regulations, it was found necessary to make an example of some of these delinquents, and several were summoned into court in Waltham, Dedham and Quiney. In Quiney a cattle trader pleaded *nolo contendere*, and his case was placed on file. In Waltham, in March, two farmers from Weston and a cow dealer from Watertown were summoned before the district court, and were fined \$25 each for driving cattle in posted towns without a permit. The scene of operations was then transferred to the district court in Dedham, and two cow dealers were fined \$20 each for driving cattle on the streets of Wellesley; and a calf collector from Needham was fined a similar sum for removing a calf from a farmer's premises

without a permit. This had a salutary effect on the rest of the uneasy ones, and no further trouble in this direction worthy of mention was experienced.

In May there arose another difficulty to be encountered, namely, the necessity for sending young stock out of the quarantined district to pasture for the summer. In parts of the quarantined district the farmers can winter more stock than they can summer. This condition prevails particularly in Lincoln, Concord, Lexington, Acton, Littleton and several of the adjacent towns. Many of the farmers send large numbers of cattle to southern New Hampshire every summer, others have pastures in Ashby, Ashburnham, Westminster, Rutland, Princeton and Hubbardston, and when turning-out time came they were very desirous of sending their animals away for the season.

The situation was finally relieved by the United States Secretary of Agriculture issuing an order providing that cattle could be sent to New Hampshire to pasture, subject to the rules and regulations of the New Hampshire Cattle Commission, the cattle to be inspected before shipment by an agent of the Bureau of Animal Industry, and carried by train to the nearest point to the pasture in New Hampshire, and driven the remaining distance.

In this State a similar arrangement was made for those who had pastures in Worcester County. Their cattle were examined by an agent of the Cattle Bureau of the State Board of Agriculture, and then carried to the nearest point to their destination. If the quarantine had been in force in the autumn, it would have been necessary to inspect the cattle and give permits to bring them home again, but the removal of the quarantine regulations did away with the necessity for this.

When Vermont, New Hampshire and Massachusetts were under quarantine by the order of the United States Secretary of Agriculture, it was found that there were many farms on the boundary line which were partly in one State and partly in another, and owners of these farms could not legally drive cattle from one part of their farms to another. This difficulty was remedied by the United States Department of

Agriculture giving a permit to owners to do so, after the application had been approved by the Cattle Commission in an adjoining State and by the Chief of the Cattle Bureau of the Massachusetts State Board of Agriculture.

Late in the winter or early in the spring, after the known cases of foot and mouth disease had been reported, agents of the United States Bureau of Animal Industry made a house-to-house inspection in all the towns where foot and mouth disease had been found, and the adjacent towns, and in some instances went over several towns a second and third time. This work was supplemented by agents of the Massachusetts Cattle Bureau, who conducted a similar inspection in May and June, in towns not already covered by agents of the United States Government.

Agents of the United States Bureau of Animal Industry in this way found two infected herds in Lincoln, in March; two yoke of oxen in Quincy, one cow in Braintree and a small herd in Wayland, in April; and two herds supposed to be infected in Framingham, in May, that were not previously reported. All of these animals were killed and the premises disinfected.

In an outbreak of this kind, considering the unfamiliarity of our farmers with this disease, it is not surprising that a few herds should have been discovered in this way. With the few exceptions mentioned above, the cases were promptly discovered, promptly quarantined under the State authority, and immediately reported to the Chief of the United States Bureau of Animal Industry or its agent. In the cases mentioned, the oxen in Quincy were just developing the disease, and it is doubtful if the owners in two or three of the other cases had any realization of what ailed their cattle.

When Brighton market was re-opened, two veterinarians were detailed to examine the local cattle brought there, as well as any from New Hampshire and Vermont, to be sure that no undiscovered cases were introduced there to endanger the health of the animals. These were in addition to the regular agent and his assistants who test with tuberculin all out-of-the-State cattle. Later, as there seemed to be little or no danger, but one of these veterinarians has been pres-

ent Tuesdays and Wednesdays ; this precaution is still continued. During the cattle show season an agent of the Cattle Bureau attended all the exhibitions of the agricultural societies in or near the localities where the disease existed last winter, but there has been no indication of any reappearance of the trouble.

Chapter 83, Acts and Resolves of 1903, provides as follows :—

RESOLVE TO PROVIDE FOR COMPENSATING OWNERS OF ANIMALS KILLED IN EXTERMINATING THE FOOT AND MOUTH DISEASE.

Resolved, That there be allowed and paid out of the treasury of the Commonwealth, under the direction of the chief of the cattle bureau of the state board of agriculture, to the owners of animals in this Commonwealth that were slaughtered previous to April eleven in the current year, by order of the state authority, for the purpose of exterminating the disease known as the foot and mouth disease, in addition to the amount paid by the United States, a sum equal to the difference between the amount already paid and the value of such cattle, as appraised by the agents of the United States. For this purpose there may be expended from the treasury of the Commonwealth a sum not exceeding forty thousand dollars. [Approved May 26, 1903.]

Under the provisions of the above resolve, \$38,244.98 has been expended. Five owners whose cattle were killed received nothing from the State because they signed an agreement stating that they accepted a certain lump sum from the United States government as the full value of their animals ; and the Concord Reformatory made no claim, as the Legislature appropriated a sum of money with which to purchase a new herd for the institution.

The following statement shows the appraisals made upon animals killed, with the names of persons who have no claims either on all or part of their animals, the names of those who had cattle killed since April 11, 1902, and the valuation placed upon them ; also the total appraisal upon animals paid for by the United States government on a basis of 70 per cent, upon which the State of Massachusetts has paid the other 30 per cent.

Appraisal.

Appraisal in cases on which full value was paid:—

Anderson & Christofson (no claim),	\$300 00
Murray Brown (no claim),	500 00
A. A. Hutchinson (no claim),	125 00
John L. Pingry (no claim),	1,020 00
M. Henry Worden (no claim),	95 00
W. E. Hayden (calves and pigs; no claim), . .	25 00
E. Paignon, Jr. (pigs; no claim),	28 00
	—————
	\$2,093 00

Appraisal on animals killed after April 11:—

Edward DeYoung,	\$40 00
Joseph A. Merriam,	270 00
F. I. Ordway,	602 00
William Wheeler,	165 00
E. A. Morrell,	430 00
George R. Tyzzer,	218 00
	—————
	1,725 00

Appraisal on animals owned by the Massachusetts Reformatory, on which no claim will be made,	2,504 50
Appraisal on herd belonging to E. R. French, a New Hampshire man, slaughtered in Watertown en route to Brighton Abattoir from New Hampshire,	450 00
	—————
	\$6,772 50

Appraisal on animals on which 30 per cent has already been paid by the State of Massachusetts,	127,483 28
	—————

Total appraisal on all animals slaughtered in Massachusetts,	\$134,255 78
	—————

The sum of \$9,699.40 has been paid from the appropriation of the Cattle Bureau for the extermination of contagious diseases among horses and other animals to 115 owners of cattle which had been in quarantine over ten days before being killed, or where the animals recovered and were released from quarantine, as owners of infected herds were not allowed to sell any milk while there was any danger to the public health by so doing.

The provisions of the law requiring this expenditure are found in section 21 of chapter 90 of the Revised Laws, which reads as follows:—

SECTION 21. If animals have been quarantined, collected or isolated upon the premises of the owner or of the person in possession of them at the time such quarantine is imposed, the expense thereof shall be paid by such owner or person; but if specific animals have been quarantined or isolated under the provisions of section five or section nineteen for more than ten days upon such premises, as suspected of being affected with a contagious disease, and the owner is forbidden to sell any of the product thereof for food, or if animals have been quarantined, collected or isolated on any premises other than those of such owner or person in possession thereof, the expense of such quarantine shall be paid by the Commonwealth.

Towards spring it was found that the winter's storms had caused many of the posters printed on heavy cardboard to fall down or blow away, and some may have been torn down by malicious persons. In instances where it was necessary to replace these notices with new ones they were printed on cloth, which was found to be much more durable. In a similar experience all posters intended to be put up out of doors should be printed on cloth in the first place.

The Wakefield Outbreak.

The outbreak of foot and mouth disease at Wakefield in August deserves separate mention, because upon investigation it was found to be distinct from the one of the previous winter, and its source may throw some light upon the cause of the original outbreak, which started in the neighborhood where the lines of Chelsea, Everett and Revere converge, known as Prattsville, as long ago as July or August of 1902.

The outbreak in Wakefield occurred at the farm of Mr. George R. Tyzzer. The disease appeared in one of his cows Friday, August 21. By Sunday, August 23, the herd, consisting of four cows and a calf, showed unmistakable symptoms of foot and mouth disease, and was appraised and destroyed by agents of the United States Bureau of Animal Industry.

This outbreak resulted from some experiments being made at the farm by Mr. Tyzzer's son, Dr. E. E. Tyzzer, assistant in pathology at the Harvard Medical School, upon some

calves obtained from various sources in an investigation of vaccine virus. Dr. Tyzzer has kindly made a report of his observations and further experiments tried at the expense of the United States Department of Agriculture, which were undertaken to ascertain the correctness of the view that the disease could be carried by contaminated vaccine virus, and which fully proved the correctness of this supposition. Dr. Tyzzer's report will have to be considered in two parts; the first relating to the experiments at his father's farm, and the consequences; the second giving the experiments tried at the Newcomb estate, in Wakefield, which was hired by the United States Department of Agriculture for this object, and where experimental animals bought for the purpose at Brighton and Somerville were taken. The Newcomb estate is a place near Wakefield Junction, where the house had been burned, upon which there was a small stable where no cattle had been kept for a long time, and which, from its isolation, seemed suitable. The experiments at the Newcomb estate were carried on by the United States Bureau of Animal Industry in conjunction with the Cattle Bureau of the State Board of Agriculture, and with Dr. Tyzzer's assistance, who repeated the experiments with vaccine virus exactly as he had conducted them at his father's farm.

REPORT OF DR. ERNEST E. TYZZER.

PART I.—EXPERIMENTS PRECEDING THE OUTBREAK OF FOOT AND MOUTH DISEASE IN WAKEFIELD.

In the following brief account it is intended to cover the essential facts regarding the experiments which preceded the appearance of foot and mouth disease among the cows of G. R. Tyzzer of Wakefield, Mass., on the 21st of August, 1903.

Being engaged in the study of vaccine with reference to its pathology, I purchased a number of calves and kept them in a portion of my father's (G. R. Tyzzer) barn. Vaccine lesions at various stages of development were desired. It was intended in these experiments to vaccinate the calves at various points on the surface of the body, and to kill them at different intervals of time after vaccination, in order to obtain the lesions. An account of each experiment will be given below.

The ordinary commercial vaccine lymph was not used for these

inoculations, as a very fresh and active virus was desired. The virus used was obtained of a vaccine establishment, and was sent sealed in a glass tube. This seal was broken and a portion of the virus was drained into a sterile test tube and plugged with sterile cotton. This portion was used in all the subsequent experiments. Nothing was introduced into this except a sterile glass pipette, and the technique ordinarily employed with pure cultures of bacteria was always observed in handling this tube of virus. Except at times when it was being used for the inoculations, this virus was kept in a refrigerator.

The experiments may be outlined as follows:—

Calf No. 1. — Procured July 21, of Mr. Hone of North Saugus. Vaccinated July 31. Sickened and died August 4. Death, fourteen days after purchase.

Calf No. 2. — Procured July 23, of the Town Farm, Wakefield. Vaccinated July 31. Sickened and died August 5. Death, thirteen days after purchase.

Calf No. 3. — Procured July 23, of Mr. Jesse Edmunds, Wakefield. Vaccinated July 31. Sickened and died August 5. Death, thirteen days after purchase.

The above three calves were fed on fresh milk and boiled Blatchford's food from the time of purchase to the time of death. Some of the milk was procured from a neighboring farm, the rest from G. R. Tyzzer. They were all vaccinated on July 31, four or five days before their death. Animals recovered from the anaesthesia, and the vaccine lesions were developing in all cases. From the time of their purchase up to twenty-four hours before their death the calves seemed to be doing well and thriving.

Calf No. 4. — Procured August 4, of G. R. Tyzzer. This calf had been kept in stable below for three days previous to purchase. Was not vaccinated. Sickened and died August 7. Death, three days after purchase, and about six or seven days after birth.

Calf No. 5. — Procured August 4, of Mr. Strong, Wakefield. This calf was not vaccinated. Sickened and died August 9. Death, five days after purchase.

These two calves (Nos. 4 and 5) were fed a larger amount of fresh milk and a smaller amount of Blatchford's meal, and, as has been noted, were not vaccinated. They were, however, kept in the same places as calves Nos. 1, 2 and 3, and were fed from the same pails.

The train of symptoms preceding death was practically identical in all the five calves. In calves Nos. 1, 2 and 3 vaccine lesions developed at the various points inoculated. In calf No. 1 there appeared, on the border of an inoculation made on the edge

of the lip, a vesicle of the size of a cherry, distended with clear fluid. This was ruptured by the animal on the day of its appearance. No similar vesicles were observed in calves Nos. 2 and 3.

These five calves ate well and were apparently thriving up to a period of not more than twenty-four hours preceding their death. It was noticed in some of the calves at this time that the mouth felt slimy when the fingers were introduced for feeding. There was no "slobbering" at any time.

Twelve hours before death the animals were less active. Three of the five were off their feed, and could only be roused up with considerable difficulty. Following this the calves were unable to stand. There was labored respiration for several hours before death, and the animals became progressively weaker and finally insensible. In each case death took place in about twelve hours after the animal showed marked symptoms, *i.e.*, loss of appetite or weakness. There was no marked diarrhoea.

Pathological Findings.

There was slight hypostatic congestion of the lungs in two calves, and in one of these there was about 400 cc. of fluid in the pleural cavity. This process in the lung may have possibly been produced by the passage into the lungs of medicine, administered while the calf was comatose.

The spleens were not enlarged, and appeared pale when sectioned. The intestines were examined in all cases, and no lesions found.

The tongues were examined in all cases. In three calves, Nos. 1, 4 and 5, there were opaque patches on the upper surface of the tongue, varying from 5 mm. to 3 cm. in diameter. The epithelium here was soft, slightly swollen, and scraped off leaving a rough but not a raw surface. These lesions were much more prominent during life. In no case did these lesions appear vesicular, or contain fluid. Microscopically, the lesions were found to be limited chiefly to the epithelium, which had become necrotic over a sharply limited area. The necrosis had extended through all the layers in certain portions of the lesion. The cells were separated by a fibrino-purulent exudate. The feet were examined, and there were no vesicles present.

In summary of the above experiments, it is to be observed that all five calves presented a similarity of symptoms very suggestive of a single disease. The date of death bears no relation to the date of purchase.

Calf No. 1 died four days after being vaccinated, and calves Nos. 2 and 3 died five days after vaccination.

Calf No. 4 died three days after being placed where the others had died, but had been in the stable below for several days.

Calf No. 5 died five days after introduction into the place occupied by the first three calves.

Inasmuch as the disease which was killing these calves presented features not ordinarily met with in vaccinia, and especially on account of the peculiar lesions on the tongue suggesting foot and mouth disease, the cases were reported to Dr. Austin Peters.

The only features suggestive of foot and mouth disease were a few inconspicuous tongue lesions and its seeming infectiousness. Even this infectiousness was doubtful, as the feeding of the calves on a patent meal was more or less experimental. What made the presence of foot and mouth disease seem still more improbable was the failure of the four cows kept in the stable below to contract the disease. During the entire experiments these cows were fed each day from the buckets which were used in feeding the calves. As no disease had appeared among the cows, the presence of foot and mouth disease seemed improbable.

However, on August 21, twelve days after the death of the last calf, one of the cows refused food, and was observed "slobbering." Examination of the mouth showed a ragged ulcer, 4 cm. long, situated on the upper gum. In trying to pull out tongue a large triangular flap was torn from its tip, and the mucous membrane seemed soft and mushy. Seen later in the day, there appeared several elevated areas of mucous membrane on the dorsum of the tongue. Several shallow erosions were present about the edges of the lips. Later on, vesicles developed on the feet. The symptoms seemed characteristic of foot and mouth disease, and the barn was immediately placed under quarantine. On the day following symptoms appeared in the other animals. They were all shot by the United States inspectors August 23.

PART II.—THE EXPERIMENTAL INOCULATIONS CARRIED ON AT THE NEWCOMB ESTATE.

On account of association of vaccination inoculations with the outbreak of a disease characterized by vesicles of the mouth and feet, it was considered important to investigate the matter at length.

Several cows and calves were obtained by the United States Bureau of Animal Industry, and kept in an isolated barn on the Newcomb estate. Three calves were vaccinated on August 28 on various parts of the body, including the nose and the edge of the lower lip. The same virus was employed as was used in the vaccinations on July 31. The lesions developed in the usual manner, except that on the fourth day a blister-like vesicle developed on

the inner border of the vaccine lesion of the lip in all three calves. This was similar in every respect to the lesion observed on the lip of calf No. 1, vaccinated July 31.

One of these vesicles was ruptured, and the fluid was caught on a cloth which was then rubbed in the mouth of cow No. 3. In thirty-six hours there was a rise of temperature, which was followed in forty-eight hours by lesions in the mouth and a vesicular eruption on the udder and teats. Vesicles developed later in the cleft of hoof. The condition of the mouth and feet was identical with that found in G. R. Tyzzer's cows.

The infectiousness of the disease was established by its appearance in the other two cows (Nos. 1 and 2) without their being inoculated.

There seemed after these experiments no question but that the disease originated from the vaccine lymph used in the inoculation. It also seemed probable that in the calves there was, besides vaccinia, a second disease, which became separated in cow No. 3 when inoculated with the fluid of the vesicle which developed on the edge of the lip vaccination of the calf.

Whether or not vaccinia thus presented itself in an unusual form, or whether it was present conjointly with another disease in the case of the cows, was a possibility which it was necessary to consider. To this end lesions were excised from the cows, and a microscopical study made; and lymph collected from the vesicles was used to inoculate rabbits, in order to determine the possible presence of vaccinia. The results of these inoculations and the appearance of the lesions excised are given in the following section: —

Pathological Findings in the Experiments carried on at the Newcomb Estate.

On account of the occurrence of a vesicular eruption on the bags and teats of the cows, which cows subsequently developed vesicles of the feet, the possibility of the co-existence of vaccinia with another disease was provisionally entertained. The gross appearances of the vesicles and pustules on the bag of cow No. 5 were suggestive of cow-pox.

In order to determine the presence or absence of vaccinia in the processes observed, three lines of investigation were followed: —

1. The histological study of the skin lesions.
2. The inoculation of corneas with lymph from various lesions.
3. The vaccination of cows that had recovered from the disease, in order to find out whether the said disease had conferred immunity to vaccinia.

An exhaustive description of the various lesions does not seem desirable in this instance, and will not be attempted. The lesions submitted for examinations may be placed, for the sake of convenience, in three groups,—the mouth lesions, the vesicles of the udders and the pustules of the udders and teats.

Type I: Mouth Lesion.—This appeared during life as a sharply circumscribed opaque area of the mucous membrane, situated on the buccal pad, about 6 mm. in diameter, and slightly elevated. This lesion was associated with several large, ragged ulcerations, situated on various parts of the gum.

This is found to be microscopically an area of necrotic epithelium, the cells of which are dissociated by the exudation present. The lesion is very superficial, involves chiefly the outer three-quarters of the epithelium, and at the periphery is sharply marked off from the surrounding normal epithelium.

The epithelial cells are necrotic, and stain intensely with the diffuse stain. The nuclei may be fragmented and deeply stained, but in general they are very pale, and are in many instances represented by a light spot in the cell. The exudation is purulent or fibrino-purulent in character. The underlying connective tissue contains but few leucocytes. This does not correspond in any essential feature to a vaccine lesion.*

Type II: Vesicles of the Udder and Teats.—These were excised from cow No. 3 the second day after their appearance. One lesion measures about 3 mm. in diameter, and is very superficial. Another in the same specimen has become dry, and is represented by a crust. The third lesion measures 2 cm. in length, the entire epithelium is destroyed, and the dermis is involved for some distance below. The appearances of the necrotic epithelial cells agree in all respects to those of the mouth lesions. The cells are, however, separated by a larger amount of fluid exudate, and either the upper layers of the epidermis or the epidermis as a whole is lifted up to form a vesicle. The vesicles are in all cases filled with sero-fibrinous exudate, containing at this stage many leucocytes and free necrotic epithelial cells. In lesions where the process is more extended, the base of the vesicle is composed of tissue infiltrated with leucocytes, and there is considerable extravasation of blood into the vesicle.

Type III: Pustules and Infected Hair Follicles.—Under this heading are described all those skin lesions obtained from the various cows at the time of autopsy. Most of these consist of

* Lesions identical in most respects with that just described were found on the tongues of calves which died during the vaccine experiments carried on at the estate of George R. Tyzzer in the early part of August.

pustules of various sizes, which, from their position and character of the necrosis present, may have arisen from vesicles similar to those just described. The lesions from cow No. 5, which were supposed to be cow-pox vesicles, gave no evidence of that disease. Large numbers of cocci are present.

In summary of the above lesions, it is to be noted that they in no instance contain anything typical of the vaccine process. Furthermore, it is impossible that pustules such as were found in case of cow No. 5 could have arisen from vaccine lesions in the time given, and they afford no evidence of that process.

Corneal Inoculations in Rabbits.

Experiment No. 1: Sept. 4, 1903.—Shallow incisions were made in the corneas of two rabbits, and lymph obtained from the foot vesicles of cow No. 3 was rubbed in. Following this inoculation there appeared no gross sign of inflammation, and the cornea became apparently normal. The rabbits were killed three days after inoculation. Microscopical examination showed in each cornea the repair of a simple injury.

Experiment No. 2: Sept. 8, 1903.—The corneas of two rabbits were inoculated with lymph from vesicles on the udders of cow No. 3. There appeared subsequently no inflammation in the eyes of either rabbit. One was killed three days and the other eight days after inoculation. On histological examination, all four corneas were found to be undergoing repair to a simple injury.

Concerning the results of the two experiments just noted, it should be understood that when the rabbit's cornea is inoculated, either with active vaccine lymph or with small-pox virus, a characteristic lesion is produced, which contains large numbers of the vaccine organisms, *Cytoryctes vacciniae*. Inasmuch as this lesion is very constant, and forms a delicate test for the presence of vaccine virus in every form thus far met with, it seems improbable that either the fluid of the udder vesicles or the fluid of the foot vesicles contained vaccine.

Experiment No. 3: Sept. 18, 1903.—The corneas of calf No. 7 were inoculated with material from the vesicles of the bag of cow No. 5. This was followed by inflammation in both eyes. There was considerable opacity and loss of corneal substance. The calf was killed three days after inoculation. Examined histologically, there was a considerable degree of œdema of the cornea as a whole. Masses of staphylococci were found in the tissues at the base and edges of the ulcer. There is no evidence of vaccinia,

and the lesion is evidently due to cocci, which it will be remembered were found in large numbers in the pustules of cow No. 5, which lesions were used for the inoculations.

Vaccination of Cows.

The following experiment was undertaken in order to ascertain whether or not the cows that had passed through the disease in question were immune to vaccinia:—

Experiment No. 4: Sept. 18, 1903.—Cows Nos. 1 and 3 were vaccinated with commercial vaccine lymph. Both were killed three days after. Several small papules were found at the site of inoculation in each cow. Microscopical examination shows in both cow No. 1 and cow No. 3 typical early vaccine lesions. These lesions present the vacuolar degeneration of the epidermal cells and the parasitic protozoan *cytoryctes* peculiar to vaccinia.

Summary.—The mouth lesions and the vesicles occurring on the udders present a special type of necrosis, and represent a process entirely distinct from vaccinia.

The pustules obtained from cow No. 5 showed nothing indicative of vaccinia, but contained cocci in large numbers. Other pustular lesions represent suppuration about hair follicles.

The inoculation of rabbits' corneas with lymph from various lesions gave in all cases negative results, eliminating the possibility of vaccinia.

Two cows having passed through the eruptive disease described in this report were not immune to vaccinia, as has been shown by the inoculation of vaccine lymph and the subsequent microscopical study of the lesions.

In conclusion, it may be stated that no evidence of the presence of vaccinia in the diseased cows has been obtained either through experimental inoculation or through histological study of the various lesions. Lesions developing at the points vaccinated have been studied from both the calves vaccinated on July 31 on G. R. Tyzzer's estate, and from the calves vaccinated August 28 on the Newcomb estate. They all show a typical vaccine process. The fact that the calves inoculated on the Newcomb estate did not die, as did those inoculated four weeks earlier on the Tyzzer estate, may possibly be accounted for either by their age causing them to react in a different manner to the disease, or by the attenuation of the virus while being kept for four weeks on the ice.

It is evident, from the experiments carried on at the Newcomb estate, that a disease characterized by a rise of temperature, vesicles of the mouth, feet and udders, and which cannot be distin-

guished clinically from foot and mouth disease, has been traced to vaccine virus. The lesions do not resemble vaccine lesions microscopically, the lymph will not produce vaccine lesions in the rabbit, and the cows which have had the disease are not immune to vaccinia. The lesions correspond microscopically to the descriptions of the vesicles of the foot and mouth disease, and there is reason to believe that the process is foot and mouth disease.

E. E. TYZZER,

Assistant in Pathology, Harvard Medical School.

While these experiments were being carried on it was necessary to have some one present night and day to record the results in detail, to care for the animals and to keep off trespassers. The agent of the United States Bureau of Animal Industry in charge of the New England office, Dr. S. E. Bennett, assigned two of his assistants to this work, Drs. U. G. Houck and G. A. Johnson; while Dr. W. T. White, an agent of the Cattle Bureau of the State Board of Agriculture, was detailed to represent the State. They divided the day into watches of eight hours each, taking turns in sleeping on the premises.

At the conclusion of the experiments they made a full and detailed report of their observations to Dr. S. E. Bennett, a copy of which is on file in the office of the Cattle Bureau, together with a copy of a report of Dr. Tyzzer to Dr. Bennett; but for publication at this time it seems better to make use of Dr. Tyzzer's report to the Chief of the Cattle Bureau, without going into the matter at greater length.

It is perfectly evident, from the results of these experiments, that vaccine virus may become contaminated with the virus of foot and mouth disease, and convey the latter through the medium of animals used for the production of vaccine virus. This accidental discovery may be the solution of the cause of the original outbreak.

As nearly as can be ascertained, the first place for foot and mouth disease to make its appearance was upon the premises of the late Owen Clark, in Prattsburg, just over the Revere line, either late in July or early in August, 1902. By the latter part of August it had spread to the premises of two or three of his neighbors, and thence was carried to various

points where the disease prevailed during the autumn and winter of 1902 and 1903.

Prior to the time of the discovery and public announcement of foot and mouth disease, the middle of November, 1902, the New England Vaccine Company, of Chelsea, bought the young cattle it used for the production of vaccine virus from Mr. Clark, who would buy thrifty looking young cattle from various sources, and when they had been used at the New England Vaccine Company's establishment he would take them home to his place, where they were kept for a while until he could dispose of them.

The proprietor of the New England Vaccine Company states that the vaccine virus produced there during the last three or four years has retained its strength to a remarkable degree, and that it has not been necessary to introduce new "seed," as is often done at these establishments when the virus is found to be deteriorating; but it has been his custom when inoculating animals to put in a couple of "control" points of virus placed on the market by other producers, in order to compare the quality of his with theirs, and to be sure that his product was maintaining its standard of strength as compared with others.

During 1902 he used the product of six different American manufacturers of vaccine virus, among others the same establishment from which Dr. Tyzzer's supply was obtained, which was used in the Wakefield experiments.

During the summer of 1902 the proprietor of the New England Vaccine Company was in Europe, and little was done at that establishment; but in order to keep the vaccine virus from losing its vitality it was necessary for his assistant to inoculate an animal every month or six weeks, for the purpose of carrying the supply along at a standard strength. When one of these inoculations was made, "control" points were also put in for comparison. It does not seem unlikely that a heifer may have been inoculated in July, and control points used which were contaminated with foot and mouth disease virus, enabling the animal to convey the disease to Owen Clark's premises either late in July or early in August, without contaminating the vaccine virus produced by

the New England Vaccine Company; as it has been shown by Dr. Tyzzer's investigations that the calves inoculated with a mixed vaccine and foot and mouth disease virus did not show easily recognizable symptoms of foot and mouth disease, yet they were capable of producing it in an unmistakable form among the cattle with which they were kept. At least, there is no history to show that animals used later at the New England Vaccine Company's establishment for the production of vaccine virus had any disease other than cow-pox. However, it is only fair to state that during September some experiments were undertaken at Bussey College, to see if vaccine virus, as put upon the market from the establishment whence Dr. Tyzzer's supply came, could produce foot and mouth disease. Some was procured from the manufacturer in small sealed capillary glass tubes ready for use, and two calves inoculated on the gums and lips, using a tube for each calf. These calves were kept with two young cows for a month, but no lesions other than those of cow-pox were observed in any of these animals.

In the report of the Chief of the Cattle Bureau to the State Board of Agriculture, made in January, 1903 (see page 350 of report of secretary of State Board of Agriculture for 1902), it is stated that it is a difficult matter to say positively just where the disease came from; but, as it first appeared in Prattsville, a locality in Chelsea, "and, as Chelsea is next to East Boston, where the foreign shipping comes in, it is not unlikely that the infection was brought over on a foreign steamer in hay or in straw used for packing merchandise, and in some way was carried to one of the places in this locality, and other herds near by were contaminated." But in view of the fact, as ascertained by Dr. Tyzzer's researches, that foot and mouth disease may be conveyed by means of impure vaccine virus, and from the information gained from the proprietor of the New England Vaccine Company, it does not seem unlikely that the source of the original outbreak may have been due to contaminated vaccine virus used for "control" points at the New England Vaccine Company's establishment, and that the animal thus infected carried it to Owen Clark's, whence it spread.

As foot and mouth disease prevails extensively in France, Italy, Austria and Switzerland, and also to a less degree in some of the other European countries, it does not seem impossible for the disease to have been imported from Europe in fresh "seed" brought over to some vaccine virus establishment in the United States, to renovate a product that was losing its vitality.

This seems an additional argument in favor of the establishment by the State of a vaccine-producing plant, as provided for by the Legislature of 1903, as the production of biological products of all kinds should be carried on only by the most thoroughly trained scientists, and all such material used in medicine should be under the direction and control of carefully educated experts employed either by the national or State government.

Statistics of Foot and Mouth Disease.

The following table gives the towns where the disease actually occurred, and the number of infected herds and animals, as well as the disposition made of them. In addition, a number of herds were quarantined early in the outbreak, thought to have been exposed by receiving cattle out of droves from Brighton, which had carried the disease in some cases. These were afterward released. Some were in towns where the disease did not appear. These towns are not mentioned in the table, but in the figures below the table the total number of animals quarantined because of the disease or for precautionary reasons is given.

Cities and Towns in which Foot and Mouth Disease existed, Number of Herds affected, and Disposition of the Animals in the Affected Herds.

CITY OR TOWN.	QUARANTINED.				KILLED BY UNITED STATES GOVERNMENT.			RELEASED.		DIED.	
	Herd.	Cattle.	Sheep.	Swine.	Cattle.	Sheep.	Swine.	Cattle.	Sheep.	Swine.	Cattle.
Acton,	11	178	-	11	158	-	8	20	-	3	-
Andover,	1	44	-	8	-	-	-	44	-	8	-
Arlington,	1	13	-	-	13	-	-	-	-	-	-
Attleborough,	3	52	-	2	47	-	2	5	-	-	-
Barre,	2	37	-	2	37	-	2	-	-	-	-
Billerica,	1	46	-	-	46	-	-	-	-	-	-
Boston,	1	10	-	-	10	-	-	-	-	-	-
Boxborough,	2	43	-	2	31	-	-	11	-	2	1
Braintree,	3	37	-	11	37	-	9	-	-	2	-
Bridgewater,	1	19	-	-	19	-	-	-	-	-	-
Burlington,	3	38	-	15	11	-	15	27	-	-	-
Carlisle,	6	79	1	4	73	-	-	5	1	4	1
Chelmsford,	2	73	-	10	59	-	10	-	-	-	14
Chelsea,	3	24	-	-	1	-	-	23	-	-	-
Cohasset,	1	2	-	2	2	-	-	-	-	2	-
Concord,	13	293	-	465	273	-	5	17	-	460	3
Danvers,	1	7	-	-	7	-	-	-	-	-	-
Dedham,	3	64	-	16	26	-	-	38	-	16	-
Dover,	3	56	5	5	56	5	5	-	-	-	-
Everett,	1	6	-	-	4	-	-	2	-	-	-
Foxborough,	1	29	-	-	29	-	-	-	-	-	-
Framingham,	4	84	1	14	83	1	14	1	-	-	-
Grafton,	1	10	-	16	10	-	10	-	-	6	-
Harvard,	1	6	-	-	5	-	-	-	-	-	1
Lawrence,	1	5	-	-	5	-	-	-	-	-	-
Leominster,	1	1	-	-	-	-	-	1	-	-	-
Lincoln,	8	170	-	16	162	-	16	7	-	-	1
Littleton,	9	160	-	15	99	-	-	61	-	15	-
Marlborough,	3	49	-	6	47	-	6	-	-	-	2
Medfield,	2	119	2	250	98	2	-	21	-	250	-
Methuen,	7	174	-	54	33	-	40	137	-	14	4
Milton,	1	2	-	-	-	-	-	2	-	-	-
Natick,	1	16	-	5	14	-	-	2	-	5	-

Cities and Towns in which Foot and Mouth Disease existed, etc.—Concluded.

CITY OR TOWN.	QUARANTINED.				KILLED BY UNITED STATES GOV- ERNMENT.			RELEASED.			DIED.
	Herds.	Cattle.	Sheep.	Swine.	Cattle.	Sheep.	Swine.	Cattle.	Sheep.	Swine.	Cattle.
Needham,	4	185	14	21	182	—	16	3	14	5	—
North Andover, . . .	2	89	17	—	87	17	—	—	—	—	2
Pepperell,	1	2	—	—	2	—	—	—	—	—	—
Quincy,	5	57	—	—	57	—	—	—	—	—	—
Raynham,	1	3	—	—	3	—	—	—	—	—	—
Revere,	1	32	—	—	—	—	—	32	—	—	—
Sharon,	2	39	—	40	33	—	—	3	—	40	3
Southborough, . . .	4	169	—	—	166	—	—	—	—	—	3
Stow,	1	30	—	2	30	—	—	—	—	2	—
Sudbury,	4	70	—	4	10	—	—	58	—	4	2
Walpole,	1	4	—	—	—	—	—	4	—	—	—
Watertown,	3	60	—	4	56	—	4	4	—	—	—
Wayland,	3	33	—	73	21	—	48	12	—	25	—
Westborough, . . .	8	236	—	17	215	—	10	19	—	7	2
West Bridgewater, .	3	97	—	2	97	—	2	—	—	—	—
Westford,	4	54	—	—	54	—	—	—	—	—	—
Weston,	3	72	25	14	71	25	14	—	—	—	1
Westwood,	2	123	—	—	123	—	—	—	—	—	—
Totals,	154	3,301	65	1,106	2,702	50	236	559	15	870	40

NOTE.—In addition to the above, there were 10 goats quarantined, scattered among 5 of the affected herds, 5 of which were killed by the United States government,—3 in Lincoln and 2 in Needham.

During the continuance of the outbreak there were 220 herds quarantined on suspicion of having the disease, or on account of having been exposed to it. Of this number, 64 herds were released in the course of a few weeks, it having been found that they were not diseased, or in a very few cases a few animals had it mildly, and recovered; 130 herds were killed either wholly by agents of the United States Bureau of Animal Industry, or a portion of the animals killed; 26 herds were more or less affected, but recovered, and were released on the final lifting of the quarantine on July 15, 1903.

Total Number of Animals.

Total number of animals quarantined,	5,537
Total number of animals killed by the United States government,	2,993
Total number of animals died from the disease,	40
Total number of animals released early, as not diseased,	959
Total number of animals released on July 15, 1903,	1,545

Of the above number of animals, there were 127 sheep quarantined, 50 of which were killed ; 1,210 swine quarantined, 236 of which were killed ; 10 goats quarantined, 5 of which were killed.

In addition to the above, there were 19 herds, comprising 226 animals, quarantined as a matter of precaution, or in enforcing the regulations, all of which were soon released.

On the 5th of December, 1902, there were about 138 herds, comprising 2,915 animals, that were turned over to the United States Department of Agriculture to deal with as they saw fit ; and it was not until after this date that any animals were slaughtered by the agents of the United States Board of Animal Industry.

Neat Cattle.

There were 4,190 head of neat cattle quarantined, as follows :—

Cows or heifers,	3,866
Bulls,	108
Oxen,	33
Calves,	183

The cattle quarantined were disposed of as follows :—

	Cattle.	Calves.	Totals.
Released early, as not diseased,	860	13	873
Killed by the United States government,	2,572	130	2,702
Died from the disease,	34	6	40
Released on lifting of the quarantine,	541	34	575

Between July 15, 1903, and Dec. 15, 1903, there were 8 cases reported as being suspicious, in 3 of these cases one or more animals being quarantined. The animals were

promptly examined, and in no case was there any disease found, except in the case of George R. Tyzzer of Wakefield, who had 4 cows and 1 calf killed by the United States government on August 23.

The following figures, from the nineteenth annual report of the United States Bureau of Animal Industry, show the extent of the whole outbreak in New England, the number of animals killed, and the amounts paid for them by the United States government:—

The tables which follow show the number of herds and animals found affected with foot and mouth disease, the number slaughtered, the compensation paid, etc. These figures include all the animals in the infected herds, whether they showed symptoms of the disease or not. As in an outbreak of this disease all the animals exposed contract it in the course of a week or two, it was assumed that where one or more animals in a herd showed clear evidence of the disease all the rest were affected.

The difference between the number of cattle affected (4,712) and the number slaughtered (3,872) represents those that either died or recovered. Nearly all the recoveries were in the early cases, where the disease had run its course before the work of slaughtering was begun, or before those herds could be reached. After the commencement of the work of eradication no newly affected herds were allowed to be held for recovery.

Number of Herds and Cattle affected with Foot and Mouth Disease since the Beginning of the Outbreak, as reported by Months.

MONTH.	MASSACHUSETTS.		NEW HAMPSHIRE.		VERMONT.		RHODE ISLAND.		TOTALS.	
	Herds.	Cattle.	Herds.	Cattle.	Herds.	Cattle.	Herds.	Cattle.	Herds.	Cattle.
November, 1902,* . . .	62	1,219	—	—	4	47	7	234	73	1,500
December, 1902, . . .	71	1,536	4	37	17	288	8	110	100	1,971
January, 1903, . . .	9	225	—	—	—	—	—	—	9	225
February, 1903, . . .	6	196	—	—	1	16	3	16	10	228
March, 1903, . . .	3	55	28	444	—	—	—	—	31	499
April, 1903, . . .	3	9	15	221	—	—	—	—	18	230
May, 1903, . . .	2	28	1	31	—	—	—	—	3	59
Totals, . . .	156	3,268	48	733	22	351	18	360	244	4,712

* These are the figures of official record, but it is known in a general way that there were more animals affected previous to November.

Animals slaughtered by the United States Department of Agriculture.

STATES.	Herds.	Cattle.	Hogs.	Sheep and Goats.	Total Animals.
Massachusetts, . . .	129	2,708	229	55	2,972
New Hampshire, . . .	48	733	68	100	901
Vermont,	22	351	55	74	480
Rhode Island, . . .	6	80	8	-	88
Totals,	205	3,872	360	229	4,461

Appraised Valuations and Compensation paid for Animals slaughtered.

STATES AND ANIMALS.	Number.	Appraised Value on Health Basis.	Average per Head.	Net Compensation (70 Per Cent.).	Average per Head.
<i>Massachusetts.</i>					
Cattle (not including calves), .	2,589	\$131,238 58	\$50 69	\$91,867 00	\$35 48
Calves,	119	1,021 79	8 59	715 25	6 01
All cattle,	2,708	\$132,260 37	\$48 84	\$92,582 25	\$34 19
Hogs,	229	2,269 43	9 91	1,588 60	6 94
Sheep and goats,	55	444 00	8 07	310 80	5 65
Totals,	2,992	\$134,973 80	-	\$94,481 65	-
<i>New Hampshire.</i>					
Cattle (not including calves), .	668	\$28,704 00	\$42 97	\$20,092 80	\$30 08
Calves,	65	539 00	8 29	377 30	5 80
All cattle,	733	\$29,243 00	\$39 90	\$20,470 10	\$27 93
Hogs,	68	574 50	8 45	402 15	5 91
Sheep,	100	497 00	4 97	347 90	3 48
Totals,	901	\$30,314 50	-	\$21,220 15	-
<i>Vermont.</i>					
Cattle (not including calves), .	301	-	-	\$9,348 00	\$31 06
Calves,	50	-	-	590 00	11 80
All cattle,	351	-	-	\$9,938 00	\$28 31
Hogs,	55	-	-	429 32	7 81
Sheep,	74	-	-	325 75	4 40
Totals,	480	-	-	\$10,638 07	-
<i>Rhode Island.</i>					
Cattle (not including calves), .	79	\$3,523 00	\$44 59	\$2,466 10	\$31 22
Calves,	1	3 00	3 00	2 10	2 10
All cattle,	80	\$3,526 00	\$44 08	\$2,468 20	\$30 85
Hogs,	8	65 00	8 12	45 50	5 69
Totals,	88	\$3,591 00	-	\$2,513 70	-

Summary.

ANIMALS.	Number.	Net Compensation.	Average per Head.
Cattle (not including calves),	3,637	\$123,773 90	\$34 03
Calves,	235	1,684 65	7 17
All cattle,	3,872	\$125,458 55	\$32 40
Hogs,	360	2,465 57	6 85
Sheep and goats,	229	984 45	4 30
Total compensation paid,	-	\$128,908 57	-

It was not until about the middle of October that the United States Secretary of Agriculture issued the final order removing all quarantine restrictions from Massachusetts on account of foot and mouth disease, as follows:—

BUREAU OF ANIMAL INDUSTRY ORDER, NO. 119.

REMOVAL OF QUARANTINE ON RUMINANTS AND SWINE IN THE STATES OF MASSACHUSETTS AND NEW HAMPSHIRE.

UNITED STATES DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., Oct. 14, 1903.

Whereas, All animals affected with foot and mouth disease in the States of Massachusetts and New Hampshire have been destroyed, and the premises occupied by them have been thoroughly disinfected, and the contagion of this disease has been eradicated;

It is hereby ordered, That the quarantine upon cattle, sheep and other ruminants and swine, imposed on account of the existence of foot and mouth disease, be removed, and the orders of this department relating to such quarantine are hereby revoked. The above-named animals or their products may, therefore, be shipped or be otherwise moved from said States without restrictions other than may be imposed by the authorities of the States to which such animals or products are destined.

JAMES WILSON,
Secretary.

Prior to this, however, the following order was issued, providing that shipments abroad of cattle and sheep from the port of Boston could be resumed with safety:—

BUREAU OF ANIMAL INDUSTRY ORDER, NO. 116.

SPECIAL ORDER, OPENING PORT OF BOSTON TO EXPORTATION OF ANIMALS.

UNITED STATES DEPARTMENT OF AGRICULTURE,

OFFICE OF THE SECRETARY,

WASHINGTON, D. C., July 20, 1903.

It is ordered, That the order of Nov. 27, 1902 (Bureau of Animal Industry Order, No. 100), prohibiting the exportation of cattle, sheep and other ruminants and swine from the port of Boston, on account of the existence of foot and mouth disease in the State of Massachusetts, be, and the same is hereby, revoked, and said animals may be allowed exportation from said port from and after this date.

Any other prior order or part of order inconsistent with this is modified in accordance herewith.

JAMES WILSON,
Secretary.

It was not, however, until nearly the end of September that the British government would allow any shipments of cattle or sheep to be landed in England. While a few shipments were made to Antwerp previous to this time, the port of Boston was practically closed to shipments of live animals to foreign ports for about ten months. As this business is worth at least \$25,000 per week to the railroad companies having terminals in Boston, and as much more to the steamship companies which own vessels sailing from this port, it can readily be seen that the outbreak of foot and mouth disease cost the commerce of Boston about \$2,000,000, — by far the largest individual item of the whole outbreak.*

While the stamping-out method is a very radical one in dealing with such a disorder as foot and mouth disease, yet under the circumstances it seems to have been the best, and the results obtained fully justify the means.

The last and only outbreak of foot and mouth disease in Massachusetts, previous to the one of 1902 and 1903, occurred in the fall and winter of 1870 and 1871. It was much

* The estimate given in the report of the Chief of the Cattle Bureau, that the loss of business cost the port of Boston \$100,000 per day, upon careful inquiry proves to have been a great exaggeration; a loss of \$2,000,000, however, is a sufficiently large sum to show the gravity of the situation.

more widespread than the one recently stamped out, being first imported into Canada, whence it was carried to the stock yards at Albany, N. Y., and spread from there to various points in New York State and western Connecticut, and was also more widely disseminated over Massachusetts than it was during the later outbreak. The Massachusetts Cattle Commissioners at that time closed the Brighton market to all cattle except those for immediate slaughter, and also prohibited moving cattle on the highways in certain towns. The Brighton yards were disinfected with carbolic acid and chloride of lime, and not reopened until April, three months earlier than in the recent outbreak, but beyond this no other measures were taken; yet the disease disappeared in the spring of 1871, and did not manifest itself again here for thirty-one years. It seems to be an exotic in this climate, and appears to have a tendency to disappear. On the other hand, we know it to have been imported into Great Britain in 1839, and it was not until 1894 that it was finally eradicated by means of quarantine measures alone. Since 1894 it has reappeared in England in 1900 and 1901, being reimported in some way from the continent; and in these later outbreaks the stamping-out process has been resorted to, with marked success.

It is said that of late years there has been a tendency for foot and mouth disease in Europe to assume a much more virulent type than formerly, and from all accounts it seems to have been much more severe during the recent outbreak than in the earlier one. This would make the disease more difficult to eradicate than when it appeared in a mild form.

At the time of the outbreak in 1870 and 1871, the great export business in live animals and the enormous cattle industry of the west were in an undeveloped state; and this renders the matter one of much greater importance and seriousness at the present time than it did thirty years ago. There are probably sections of the United States where this disease would not prove a tender exotic, because of different climatic conditions; and if it once obtained a foothold in these localities, it might prove to be much more difficult of eradication.

For these reasons, one cannot question the wisdom and propriety of the stamping-out method, or fail to approve of and admire the promptness and energy with which it was carried out.

The country is well rid of this scourge, and it is hoped that it will never appear here again. The cost to the community has been very heavy, as the following figures will show :—

Loss of commerce to the port of Boston,	\$2,000,000 00
Compensation paid owners by the United States government for animals destroyed,	128,908 00
Expense for inspectors, disinfecting corps, etc., of Bureau of Animal Industry, as much more at least, — say	130,000 00
Expense to State of Massachusetts for agents of Cattle Bureau, disinfecting corps, etc.,	20,219 05
Amount paid by Massachusetts for quarantine claims, Compensation paid by State to owners, of 30 per cent of the valuation of animals killed,	9,699 40
	38,244 98
Total,	\$2,327,071 43

These figures alone amount to over two and a quarter millions of dollars, to say nothing of the loss to individual farmers by being temporarily put out of business, and the loss and inconvenience to cattle men by having the Brighton market closed from Nov. 26, 1902, until the 22d of the following July.

The only excuse for writing such a full and detailed account of the recent outbreak of foot and mouth disease is that it is a matter of history, which ought to be published, as it may prove of value in years to come, if there should ever be another such visitation of this malady, to show what was done at this time. The discoveries in connection with the outbreak in Mr. Tyzzer's herd, and subsequent experiments, are also of great scientific interest, and should be made a matter of record. The report of the Chief of the Cattle Bureau upon foot and mouth disease, made to the State Board of Agriculture in January, 1903, together with the above report, gives a full and detailed history of foot and mouth disease in Massachusetts in 1902 and 1903.

It is hoped that this account shows that, while the greater part of the expense and much of the work fell upon the United States Bureau of Animal Industry, yet there is much that can be done by the State in co-operating with it, and supplementing the work of the national authorities, besides assisting in limiting the spread of the disease by quarantine methods, closing markets, forbidding auctions, and prohibiting moving certain animals and infected products in certain towns and districts.

GLANDERS.

More horses have been killed on account of glanders or farcy or have died therefrom during the year ending Dec. 15, 1903, than recorded in any previous year in Massachusetts. If there has been any such mortality heretofore, it was before a systematic attempt was made to have every case reported. At present it is thought that very few cases occur that are not brought to the notice of the Chief of the Cattle Bureau. If progress in combating this disease is not made to the extent that is desired, at least, under the system of obtaining reports from various sources that has been followed during the past three or four years, the gravity of the situation has been shown.

The total number of animals upon the books of the Cattle Bureau for the past year is 1,160 horses and mules; of the latter there are only 2 or 3. Of these animals, 860 have been killed (except a few which died), either by order of the Chief of the Cattle Bureau or that of the veterinarian of the Boston board of health, or with the owner's consent when informed by veterinarians of the nature of the malady. In addition, 169 cases were reported as suspicious, and later released as free from disease, after examination by an agent of the Cattle Bureau; and 131 horses have been tested with mallein in stables where glanders existed. All but 5 of the latter have been discharged as negative cases; the 5 remaining have reacted to mallein, and will have to be tested one or more times again, when, if they cease to react, they will be discharged, or if they develop physical signs of the disease they will be killed.

Most of the animals considered suspicious were quarantined

by the local inspectors of animals. Some of them were released after a simple examination by an agent of the Cattle Bureau; but in many cases it was necessary to inoculate guinea pigs with material taken from the nose, or sores on the body, or to test them with mallein, before it could be definitely decided that they were free from disease. The increase over the preceding year in the number of cases of glanders or farcy where the animals were killed is 123, but this augmentation appears to have been in and around Boston. There were 95 more horses killed in Boston, 41 more in Cambridge and 12 more in Chelsea, than in the previous year,—a total of 148; deducting this from 860 leaves 712, or 25 less than in 1902. This shows a slight decrease for the State, outside of Boston, Cambridge and Chelsea.

The most noticeable decrease has been in the Connecticut valley, where the disease seems to have almost entirely disappeared. There seems also to be a marked diminution in Fall River, Brockton, Newton and Taunton,—cities where in previous years there has been a considerable number of cases of glanders or farcy. There has been a small outbreak in Dedham and Westwood, involving about 15 horses, and in Lowell there has been an increase of 12 cases over the previous year. In Worcester it remains the same. Very few animals with glanders are found in this State west of a line drawn through Fitchburg and Worcester. When cases do occur, it is frequently due to a farmer buying a cheap horse in Boston or Worcester to help in the spring and summer's work, which is found later to be diseased, and infects a few other horses before the outbreak is eradicated.

The annual reports of the Massachusetts Cattle Commission, and of its successor, the Chief of the Cattle Bureau, show an alarming prevalence of glanders and farcy in Massachusetts,—greater than in any other Commonwealth in the United States. At the same time, it is not impossible that as serious a condition of affairs may exist in some of the great cities of the country in other States, and that public attention is not called to it, for lack of a systematic effort to obtain reports of the cases.

The following table shows a list of the cases, or suspected

cases, of glanders or farcy reported during the years 1902 and 1903, and also the increase or decrease of actual cases in the cities or towns in which they have occurred:—

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Abington, . .	—	1	—	2	—	—
Acton, . .	3	2	2	1	—	1
Acushnet, . .	—	—	1	—	1	—
Amesbury, . .	—	—	—	1	—	—
Amherst, . .	—	—	4	—	4	—
Andover, . .	4	3	—	—	—	4
Arlington, . .	10	14	8	7	—	2
Ashburnham, . .	—	2	—	—	—	—
Ashby, . .	—	—	1	—	1	—
Ashfield, . .	—	—	1	—	1	—
Ashland, . .	—	—	1	—	1	—
Attleborough, . .	—	—	2	2	2	—
Auburn, . .	6	—	3	—	—	3
Barnstable, . .	2	—	—	1	—	2
Barre, . .	2	—	1	—	—	1
Bedford, . .	—	1	1	3	1	—
Belchertown, . .	—	1	—	—	—	—
Belmont, . .	1	—	1	—	—	—
Berlin, . .	—	—	1	—	1	—
Bernardston, . .	1	1	—	—	—	1
Beverly, . .	3	—	3	21	—	—
Billerica, . .	—	—	2	1	2	—

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Blackstone, . .	-	1	-	-	-	-
Bolton, . .	-	-	1	-	1	-
Boston, . .	155	-	250	2	95	-
Bourne, . .	1	1	-	-	-	1
Boylston, . .	-	-	1	-	1	-
Braintree, . .	-	-	2	-	2	-
Brewster, . .	1	-	-	-	-	1
Bridgewater, .	-	1	-	1	-	-
Brockton, . .	18	8	9	4	-	9
Brookline, . .	6	-	6	-	-	-
Buckland, . .	-	1	-	-	-	-
Burlington, .	1	-	3	-	2	-
Cambridge, .	50	2	91	12	41	-
Canton, . .	-	-	-	2	-	-
Charlemont, .	3	-	-	-	-	3
Charlton, . .	1	1	1	-	-	-
Chelmsford, .	2	1	1	-	-	1
Chelsea, . .	12	-	24	2	12	-
Cheshire, . .	1	-	-	-	-	1
Chesterfield, .	-	-	-	1	-	-
Chicopee, . .	-	-	-	2	-	-
Chilmark, . .	-	-	1	-	1	-
Clinton, . .	1	1	1	-	-	-
Cohasset, . .	1	-	-	-	-	1
Concord, . .	-	1	-	-	-	-

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Conway, . .	-	-	-	1	-	-
Dalton, . .	-	-	1	-	1	-
Dartmouth, . .	2	-	-	-	-	2
Dedham, . .	1	-	8	-	7	-
Dennis, . .	1	1	-	-	-	1
Dighton, . .	1	-	1	-	-	-
Dover, . .	-	1	1	-	1	-
Dracut, . .	2	-	2	-	-	-
Dudley, . .	-	-	1	-	1	-
East Bridgewater,	-	-	2	-	2	-
Easton, . .	2	-	-	-	-	2
Everett, . .	8	1	9	44	1	-
Fairhaven, . .	-	-	1	-	1	-
Fall River, . .	43	4	30	5	-	13
Fitchburg, . .	3	2	5	1	2	-
Foxborough, .	-	-	-	1	-	-
Framingham, .	7	11	6	-	-	1
Franklin, . .	-	1	-	-	-	-
Freetown, . .	-	-	-	1	-	-
Gardner, . .	-	-	2	1	2	-
Grafton, . .	1	-	3	1	2	-
Greenfield, . .	1	-	-	-	-	1
Greenwich, . .	3	1	-	1	-	3
Gloucester, . .	1	2	1	2	-	-
Halifax, . .	-	-	-	3	-	-

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Hamilton, . .	-	-	3	7	3	-
Hanover, . .	1	1	-	-	-	1
Hanson, . .	1	-	-	-	-	1
Hardwick, . .	2	4	1	2	-	1
Harvard, . .	-	-	-	1	-	-
Harwich, . .	-	-	2	-	2	-
Haverhill, . .	2	1	2	-	-	-
Hingham, . .	1	-	-	-	-	1
Hinsdale, . .	-	1	-	-	-	-
Holbrook, . .	1	1	-	-	-	1
Holden, . .	-	-	2	-	2	-
Holliston, . .	-	-	4	-	4	-
Hopkinton, . .	-	-	-	1	-	-
Hubbardston, .	-	-	-	2	-	-
Hyde Park, .	3	-	1	1	-	2
Ipswich, . .	-	-	1	-	1	-
Lawrence, . .	35	2	19	3	-	16
Leicester, . .	1	-	2	-	1	-
Leominster, . .	1	1	-	3	-	1
Lexington, . .	4	2	7	3	3	-
Leyden, . .	-	1	-	-	-	-
Lincoln, . .	1	-	2	1	1	-
Littleton, . .	-	1	-	-	-	-
Lowell, . .	8	-	20	6	12	-
Lunenburg, . .	2	-	-	-	-	2

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Lynn, . .	14	1	17	2	3	-
Lynnfield, . .	2	-	-	-	-	2
Malden, . .	6	-	6	-	-	-
Mansfield, . .	1	6	-	-	-	1
Marblehead, . .	-	-	1	-	1	-
Marlborough, . .	-	1	1	-	1	-
Maynard, . .	1	1	-	-	-	1
Medfield, . .	-	-	1	1	1	-
Medford, . .	10	11	6	2	-	4
Melrose, . .	1	-	2	-	1	-
Merrimac, . .	-	1	-	-	-	-
Methuen, . .	2	6	1	1	-	1
Middleborough, . .	2	1	-	-	-	2
Milford, . .	3	-	2	1	-	1
Millbury, . .	-	-	1	-	1	-
Milton, . .	3	1	3	6	-	-
Monson, . .	1	1	-	-	-	1
Montague, . .	-	2	-	-	-	-
Nahant, . .	-	-	1	-	1	-
Needham, . .	4	1	-	-	-	4
New Bedford, . .	6	2	6	3	-	-
New Salem, . .	-	1	-	-	-	-
Newbury, . .	-	-	-	1	-	-
Newburyport, . .	5	3	6	-	1	-
Newton, . .	24	56	15	43	-	9

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Northampton, .	3	22	-	1	-	3
North Adams, .	-	-	4	-	4	-
North Andover, .	1	-	6	-	5	-
Northborough, .	2	-	2	-	-	-
Northbridge, .	2	-	1	1	-	1
Norwell, . .	-	1	-	-	-	-
Norwood, . .	1	-	1	1	-	-
Oxford, . .	-	2	1	-	1	-
Palmer, . .	1	-	-	3	-	1
Paxton, . .	1	-	1	-	-	-
Peabody, . .	2	-	4	-	2	-
Pembroke, . .	-	1	1	2	1	-
Pepperell, . .	1	1	-	2	-	1
Phillipston, .	-	1	-	-	-	-
Pittsfield, . .	-	7	-	1	-	-
Plainfield, . .	-	1	-	-	-	-
Plymouth, . .	-	1	-	-	-	-
Prescott, . .	-	1	-	-	-	-
Princeton, . .	-	-	1	-	1	-
Quincy, . .	8	2	17	8	9	-
Randolph, . .	1	-	-	-	-	1
Raynham, . .	2	1	-	-	-	2
Reading, . .	-	-	3	-	3	-
Revere, . .	5	2	3	1	-	2
Rochester, . .	1	-	-	-	-	1

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Rockland, . .	4	2	-	-	-	4
Royalston, . .	-	-	-	2	-	-
Salem, . .	3	2	-	2	-	3
Saugus, . .	2	2	-	3	-	2
Sharon, . .	2	-	-	1	-	2
Sheffield, . .	-	-	1	-	1	-
Sherborn, . .	-	-	-	1	-	-
Shrewsbury, . .	5	-	1	-	-	4
Somerset, . .	1	-	1	-	-	-
Somerville, . .	50	8	52	3	2	-
Southborough, . .	-	-	2	1	2	-
Southbridge, . .	5	-	2	-	-	3
Springfield, . .	5	2	-	1	-	5
Sterling, . .	1	1	-	1	-	1
Stoneham, . .	-	-	3	1	3	-
Stoughton, . .	1	1	1	-	-	-
Sturbridge, . .	1	-	-	-	-	1
Sudbury, . .	2	2	2	-	-	-
Sutton, . .	-	1	-	1	-	-
Swampscott, . .	1	-	1	-	-	-
Swansea, . .	-	-	-	1	-	-
Taunton, . .	8	-	1	-	-	7
Tewksbury, . .	-	-	1	1	1	-
Tisbury, . .	-	-	-	1	-	-
Townsend, . .	-	-	1	1	1	-

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Truro, . .	-	1	-	-	-	-
Upton, . .	-	-	-	1	-	-
Wakefield, . .	1	-	2	2	1	-
Walpole, . .	-	-	1	-	1	-
Waltham, . .	5	30	7	3	2	-
Ware, . .	-	-	-	1	-	-
Wareham, . .	-	2	-	-	-	-
Warren, . .	-	-	-	1	-	-
Warwick, . .	-	-	1	1	1	-
Watertown, .	5	1	3	-	-	2
Wayland, . .	1	-	-	1	-	1
Wellesley, . .	-	-	1	5	1	-
West Boylston, .	1	-	-	-	-	1
West Bridgewater,	-	-	1	-	1	-
West Springfield,	1	1	-	-	-	1
West Tisbury, .	-	-	2	-	2	-
Westborough, .	-	-	1	-	1	-
Westhampton, .	2	-	2	4	-	-
Westminster, .	2	2	2	3	-	-
Westport, . .	4	2	1	1	-	3
Weston, . .	-	-	5	2	5	-
Westwood, . .	1	-	7	-	6	-
Weymouth, .	3	-	6	1	3	-
Whitman, . .	4	-	3	1	-	1
Wilmington, .	-	-	-	1	-	-

CITY OR TOWN.	1902.		1903.		Increase.	Decrease.
	Killed or died.	Negative.	Killed or died.	Negative.		
Winchester, .	-	-	1	-	1	-
Winthrop, . .	1	1	-	-	-	1
Woburn, . .	6	1	1	1	-	5
Worcester, . .	67	7	67	9	-	-
Wrentham, . .	-	1	1	-	1	-
Totals, . .	737	290	860	295	-	-

Five horses in Newton which have reacted to mallein remain to be retested, making 1,160 horses in all.

It is only fair to state, in connection with the above table, that the veterinarian of the Boston board of health reports but 206 authentic cases of glanders or farey for the year 1903; the renderers report 195. There are names on their reports, however, which are not given by the agent of the Boston board of health; and, on the other hand, his report gives names that are not on the renderers' returns. Cases investigated outside of Boston, given on the renderers' returns, have in nearly every instance been found to be cases of glanders or farey. These returns having proven so reliable in such instances, it is taken for granted that they are equally reliable in every instance. This being the fact, the cases reported by the veterinarian of the Boston board of health and the renderers have both been entered on the books, making the total number of horses killed as infected 250.

In doubtful cases the guinea pig test has been resorted to as a means of diagnosis, as extensively as in the past few years. This work has been done by Dr. Langdon Frothingham, at the Harvard Medical School, and in this way many uncertain cases have been decided.

Mallein has also been used quite extensively, occasionally as a method of diagnosing suspected cases, but more fre-

quently for testing all the horses in an infected stable. Those that do not react are considered free from disease, and separated from those that do give a reaction. Reacting animals are retested every month or six weeks until they cease to react, or show physical evidence of disease and are killed. Mallein is supposed to have an immunizing and therapeutic value, as well as a diagnostic one. In stables where this method has been carried out it has been found possible to eradicate glanders in a number of instances, greatly to the benefit of owners as well as to the public at large. In several stables where this method has been pursued the horses have remained healthy, and no new cases have occurred for periods of over two years.

In this connection an experiment conducted by the British Board of Agriculture is interesting, as concurring with work carried on in this State. Their experiment indicates "that a horse that has ceased to react to mallein is incapable of spreading the infection of glanders. This conclusion, however, is subject to the qualification that there has been an interval of not less than two months between the last two mallein tests.. In the horses that were used in this experiment the shortest period between the last two tests to which the animal had been subjected before it was purchased by the committee was ten weeks, but in most of the cases it was considerably longer than that. We consider that in practice the mallein tests should not be repeated oftener than every three months, when the object is to ascertain whether the animal has actually recovered from glanders." The report from which the above extract is quoted is signed by the following well-known veterinarians: Alexr. C. Cope, Wm. Hunting, J. McFadyean, James McI. McCall.

Again the sad necessity of recording deaths in the human family from glanders occurs, in order to make this report complete. The State Board of Health reports 3 deaths from this cause during the past year,— 1 each in Lawrence, Chelsea and Northborough.

In the Northborough case the horse from which the owner contracted the disease was examined and ordered killed by an agent of the Cattle Bureau prior to the death of the man owning it, but after he was taken ill. The Lawrence horse

was ordered killed a day or two after the death of the owner. In the Chelsea case the horse died or was killed some time before the death of the owner, and no knowledge was had of it until the owner's death from this cause was reported.

The reports of renderers, as required by section 111, chapter 75 of the Revised Laws, continue to be of great value, as returns of many cases received at the establishments are the first reports, and often the only ones, received by the Cattle Bureau. When a case is reported as occurring outside the limits of the city of Boston, which has not previously been given, the inspector of animals in the town from which the horse came, or an agent of the Cattle Bureau, is immediately sent to examine any other horses kept upon the premises, and it is also seen that the disinfection of the stable is properly attended to. These measures undoubtedly are of great assistance in checking the spread of this malady. The following table shows the returns of renderers for the year ending Dec. 15, 1903:—

RENDERING COMPANIES.	Number of Reports.	Number of Cases.	Number in Boston.	Number out of Boston.	Number outside of Boston not previously reported.
Guy U. Barnes Rendering Company, Fall River.	18	27	—	27	5
J. J. Burke, Sherborn, . . .	4	7	—	7	—
C. S. Bard, Haverhill, . . .	1	1	—	1	—
William Higgins, Malden, . . .	4	4	—	4	3
Lowell Rendering Company, . .	3	5	—	5	—
W. C. Lawrence, Brockton, . .	9	12	—	12	3
Jas. E. McGovern, Lawrence, .	14	24	—	24	2
Muller Bros., North Cambridge, .	35	95	3	92	14
McQuade Bros., Auburn, . . .	3	5	—	5	—
N. E. Rendering Company, Brighton,	51	133	22	111	47
New Bedford Product Company, .	1	7	—	7	—
Parmenter & Polsey Fertilizer Company, Peabody.	21	28	—	28	3
A. K. Siloway, Newburyport, .	3	5	—	5	2
James P. Trainor, Auburn, . . .	3	3	—	3	1
N. Ward & Co., Boston, . . .	46	219	170	49	11
Whitman & Pratt Rendering Company, Lowell.	4	6	—	6	2
Worcester Rendering Company, .	26	57	—	57	15
Fitchburg Rendering Company, .	4	6	—	6	1
Totals,	250	644	195	449	109

It will be seen from the above table that 109 cases of glanders or farcy were reported by the renderers that had not previously been recorded in the office of the Cattle Bureau, and in most instances no other notification of them was received.

The reason for reporting the number of cases in Boston separately is because the board of health has full jurisdiction over glanders and farcy, and this Bureau has nothing to do with investigating cases which occur in Boston.

Since last September the Cattle Bureau has hired a horse and wagon, with a man or men, as needed, to go to all premises in cities and towns within easy driving distance of Boston, to disinfect stables where cases of glanders or farcy occur. A great many owners are careless, or ignorant of proper methods of disinfecting, and it is hoped that by having experienced men to do this work it will help to check the spread of the disease. Since this work was inaugurated 92 stables in 18 cities and towns have been disinfected by an agent of the Cattle Bureau.

In Somerville the inspector of animals does the work for the board of health, and it is so thoroughly done that it has not been found necessary to send an agent there.

The State has also paid a man in Worcester for the past two years to disinfect premises for owners who did not seem capable of doing it properly; but this has not been done in stables where the owners were able to do it,—it has been done only in the lower class of stables, where the owners were in many instances foreigners, and could not be made to understand the importance of the work or the proper way of doing it.

The loss of property to owners from glanders and farcy in this State is a serious matter. Between \$60,000 and \$70,000 worth of animals, at the least calculation, are killed annually, to say nothing of the danger to human life.

At the present time it seems to be the most important problem with which the Cattle Bureau has to deal, and the question arises, What more can be done towards its eradication?

The following suggestions are given for making further headway towards decreasing it:—

First. — There should be one law for the whole State. At least, the Chief of the Cattle Bureau should have the same authority in Boston that he has elsewhere ; this would not necessitate taking the power away from the veterinarian of the Boston board of health, to kill all horses reported to him in Boston that have glanders or farey, but would give the Cattle Bureau equal power to deal with cases reported to it. It would also enable the Chief of the Cattle Bureau to keep up a proper inspection of cheap auction rooms and low sales stables if it was found necessary to do so, and would give him authority to look after the cleanliness of public water troughs if need be, and to order them closed in case it was advisable ; also to organize a system of mallein testing in infected stables in Boston as well as elsewhere.

Second. — The State should thoroughly disinfect all stables where cases of glanders or farey are found, unless properly done by the local board of health.

Third. — When a horse with glanders or farey is killed, it should be ascertained where he was usually shod ; and an agent of the State should go there and disinfect the place where the horses are tied, as soon after completing the disinfection of the stable as possible. If another horse shod at the same shop is later killed for glanders, the shop should be immediately disinfected again.

Fourth. — Greater attention should be paid to the cleanliness of public watering troughs. They should have larger supply and larger overflow pipes. If they were abolished, and public watering places established with faucets, and each teamster made to carry a pail for his horses, it would be better. Going without water, except what they receive at the home stable, is no hardship for the majority of horses except in the excessively hot and dusty weather of the summer months, when it is necessary to water horses on the road when taking long trips or making long hours at work without going home.

If more money were expended in the ways suggested, much good might be accomplished. It has been customary until recently to order the horse killed, and tell the owner he must disinfect. During the last two years a little disin-

fecting has been performed by the State, and a little work done with mallein; but with the appropriations available the tendency has been to economize as much as possible in every direction, in order to save every available cent for the purpose of paying for tuberculous cattle. If more liberal appropriations cannot be made, then would it not be better to change this system for a few years, and expend a larger proportion of the money for the eradication of glanders, as the most serious problem at present confronting us?

The law provides a penalty for any one removing, transporting or selling an animal with a contagious disease, if the person knows or has reasonable cause to believe such to be the fact. Persons disposing of glandered horses always deny that they knew or suspected the existence of a contagious disease, and it is therefore useless to prosecute cases unless proof is forthcoming to show there was good reason for believing the presence of glanders and farcy. There was but one case in 1903 where the Chief of the Cattle Bureau, with the assistance of the State police, prosecuted a man for disposing of a glandered horse. This occurred at Lowell, and a conviction was not secured, as it was not possible to prove that the man knew the horse had glanders or farcy when he sold it.

Most of the work in connection with glanders during the past year, as well as in the previous year, has been done by or under the direct supervision of Dr. Howard P. Rogers, an agent of the Cattle Bureau, and this opportunity is taken to say that his efficiency and the interest he has shown are most praiseworthy and commendable.

CONTAGIOUS DISEASES OF SWINE.

During the year 1903, 36 outbreaks of contagious diseases among swine upon as many different premises have been reported to the Cattle Bureau from 23 cities and towns in various parts of the State, scattered from Bristol and Essex counties on the east to Berkshire on the west. In 2 reported outbreaks no disease of a contagious character was found to be present. The rest were all of the hog-cholera type, as this portion of the report does not include swine

exposed to or infected with foot and mouth disease, the figures for these being given under the statistics of foot and mouth disease.

The swine upon the premises where sickness resembling hog cholera has been found numbered between 700 and 800, of which 135 died, and the rest were released when the disease disappeared from among them. In some instances owners were allowed to kill for market, upon quarantined premises, pigs which were ready for the pork barrel and showed no symptoms of disease.

In a number of cases the swine were fed upon city swill or upon swill from hotels.

Hog cholera is a generic term, applied to diseases of an apparently contagious character among swine. As a matter of fact, these animals seem to have several diseases, resembling each other, but due to different causes. In addition to hog cholera and swine plague, diseases known to be due to a specific cause, pigs sometimes are made sick from washing powder used for cleaning dishes in hotels where the dish water is added to the swill. Recently the United States Bureau of Animal Industry has been investigating a malady among swine, which occurred in Iowa, the clinical symptoms of which resemble hog cholera, but in which neither the hog cholera nor swine plague bacillus was present, and for which the organism producing it has not yet been discovered. While this disease has been found thus far only in Iowa, it is not unlikely that it may exist in other localities.

In these outbreaks of disease resembling hog cholera among swine, the premises are quarantined until the sick pigs die or recover, and the pens have been disinfected. These measures seem sufficient to check the spread of the disorder and terminate the outbreak. In addition, changing the food and more attention to cleanliness seem to be beneficial.

Besides the reports of diseases grouped under the term hog cholera, there has been 1 case of tuberculosis quarantined, the animal being a sow owned in Wrentham. The inspector of animals in Wrentham made an autopsy upon her, and reported that she was badly tuberculous.

RABIES.

Rabies at present seems to be of very infrequent occurrence in Massachusetts; although it prevailed extensively in some localities a few years ago, it now seems to be practically eradicated. Since the case mentioned in the report of January, 1903, in a dog at Pittsfield, only a few cases of rabies or suspected rabies have been reported.

Three dogs with symptoms of rabies have been reported as having been killed, but, as rabbits were not inoculated from these animals, the diagnosis was not proved. Two other dogs showed suspicious symptoms, one in Cambridge in May, the other in Stoughton in September; but rabbits inoculated with material from the base of the brain from each have remained healthy, showing that the canines were not victims of hydrophobia.

There were two positive cases which are interesting, as the animals probably were infected outside of Massachusetts, and developed the disease after arrival in this State.

One of these was a green horse, bought at a sales stable in Boston a day or two after coming off the cars, and taken to Westborough May 26. Dr. W. M. Balmer of Westborough reported that the horse appeared to be feverish and ailing June 18, with a temperature of 104° F., and acted as though he had influenza. The following day, June 19, Dr. Balmer again saw his patient about 5 o'clock in the afternoon, and the only apparent improvement was a drop of two degrees in temperature. The animal still refused to eat, and objected strongly to the administration of medicine. Saturday forenoon, June 20, the horse was led out on the halter, when he ate quite a little grass, drank some water and was returned to his stall. Up to this time he showed no signs of viciousness. An hour later he would allow no one to approach his stall, and excitement seemed to increase his viciousness, he giving vent to it by kicking the sides of his stall.

About 7 o'clock in the evening Dr. Balmer was summoned in a hurry. He found the horse tearing at his breast, which he had laid open with his teeth, throwing himself down and

biting at his forearm, jumping up and kicking. He kept this up until exhausted. He made no attempt to bite any one but himself, but would kick at the approach of a person. He exhausted himself in a short time, and was apparently dying; and, as he could not be controlled by any means, it was deemed best to kill him.

At the Harvard Medical School Dr. Frothingham succeeded in producing rabies in rabbits from portions of the brain sent by Dr. Balmer.

No history can be obtained of this horse having been bitten after his arrival in Massachusetts; the probability is that he was bitten while in the West, before shipment to this State.

The other case was that of a dog owned by a vaudeville actor performing at Keith's theatre, in Boston, early in September. The dog was noticed to be ailing, and was sent to the Boston Veterinary Hospital, where a diagnosis of rabies was made, and the animal reported to the Boston board of health. Dr. Alex. Burr, veterinarian to the Boston board of health, reports that the dog was killed, and rabbits inoculated from the base of his brain developed rabies. As the owner of this dog performed in various places, an engagement at one of these theatres being usually of a week's duration, and as there is no history of any cases of rabies among dogs elsewhere in Massachusetts, the probabilities are that he was bitten while outside of the State, and developed symptoms of the disease during his master's engagement in Boston.

This is an illustration of how readily rabies might be reintroduced into Massachusetts. If this dog had strayed away and bitten other dogs, instead of being sent to the hospital, a great deal of trouble might easily have ensued.

MISCELLANEOUS CONTAGIOUS DISEASES.

The law relating to contagious diseases among animals in this Commonwealth is contained chiefly in chapter 90 of the Revised Laws, and section 28 reads as follows:—

Contagious diseases, under the provisions of this chapter, shall include glanders, farcy, contagious pleuro-pneumonia, tuberculosis, Texas fever, foot-and-mouth disease, rinderpest, hog cholera, rabies, anthrax or anthracoid diseases, sheep scab and actinomycosis.

There are other diseases of a contagious nature not mentioned in section 28, chapter 90 of the Revised Laws, over which it might be necessary to have the Cattle Bureau exercise some authority in case of their becoming troublesome, and for which the law does not seem to fully provide. Mange among cattle has recently been very troublesome in the far West and South-west, although no cases have as yet been reported in the East; a few cases reported as mange among young cattle were found to be ringworm. A few cases of mange in horses are reported to have occurred in North Attleborough early in the summer; but these cases yielded to ordinary treatment at the hands of the owners, and the trouble seems to have been limited to two stables there. A similar disease appeared in a stable in Foxborough, the owner of which runs a stable in Cottage City during the summer; the horses which he took to Cottage City developed some skin trouble, but recovered under treatment. This skin disease seems to have been carried to North Attleborough and Foxborough, as nearly as can be ascertained, by a horse used on the route of a tea company coming from Providence, which was baited at stables in these two towns.

Mange among dogs, particularly follicular mange, is a troublesome disease and a loss to dog owners. During the year several cases of follicular mange among dogs have been reported. Worthless animals with this disease should be killed, and kennels where it is bred should be quarantined until the disease has been eradicated from them. If dog fanciers or horse or cattle owners desire any legislation on mange, they should ask for it; the Cattle Bureau can enforce any laws applying to it that may be made. At present the only parasitic disease mentioned in the list of contagious diseases recognized by law is seabies in sheep. Sheep seab is a parasitic disease, and is the mange of sheep, being of the same character as mange in other animals, each species of animals having its own particular species of parasite.

Takosis is a new disease of an infectious character occurring in goats, more particularly the Angora goat, mentioned in the nineteenth annual report of the United States Bureau

of Animal Industry. The investigations made have been conducted in Washington by Dr. John R. Mohler and Dr. Henry J. Washburn. At present the Angora goat industry in Massachusetts has not attained a size and importance to attract a very great amount of public attention ; but if many persons should become interested, this disease would undoubtedly prove very troublesome, as a few of those who have already started flocks know to their cost. It is very fatal, and frequently causes the death of nearly all the animals in a flock.

Losses from *black leg* among young cattle during the past year seem to have been practically unknown ; and, beyond giving protective inoculations to a few animals in Ashby, no measures for dealing with this disease have been necessary.

In making an estimate for the appropriation needed for the Cattle Bureau during the ensuing year, the sum of \$100,000 will be necessary for carrying on the work properly ; and this has been named as the amount needed, in sending an estimate to the State Auditor in December.

Respectfully submitted,

AUSTIN PETERS,

Chief of Cattle Bureau.

